NOLOGY DEPARTMENT

FLYING

JANUARY 1948 • 25 CENTS

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DETROIT

This Is Private Flying
Second of a series.. page 28

★

The Case for SHOULDER STRAPS
page 33

NAVIONS FOR ARABIA—see page 15

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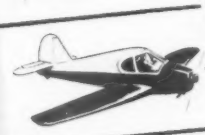

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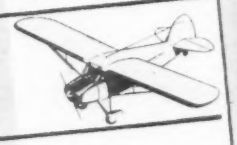

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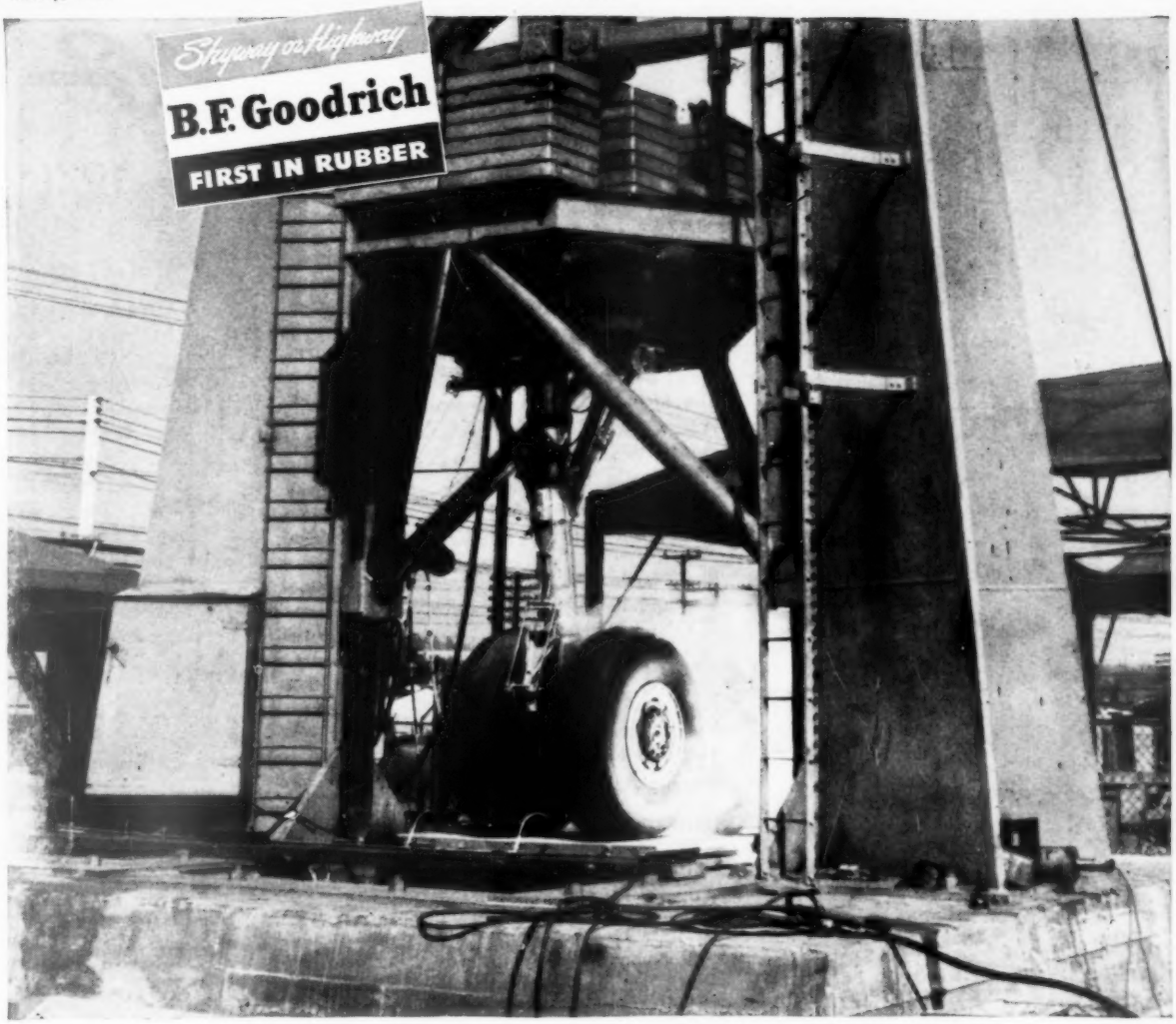

B. F. Goodrich tires outwear concrete in landing tests

RUBBER HITS CONCRETE with terrific impact when Lockheed's new drop-test machine goes into action. This mechanism tests landing gear by duplicating an actual landing.

The landing gears are lifted to the desired height on the 40-foot tower and the wheels are spun until they reach a speed of nearly 100 miles an hour. Then the landing gear drops to the concrete platform, simulating an airplane's 100 mile an hour touch-down on an airport runway. And for a few seconds, smoke pours from the tires as the wheels skid to a stop.

These punishing 125,000 pound blows are a severe test of the B. F. Goodrich tires used on the landing gear. Here's how they stood up: following the first eighty tests, Lockheed engineers reported that although a hole was worn in the concrete "runway" on which the tires landed, the tires themselves showed no appreciable wear!

These are standard B. F. Goodrich 17.00 x 20 Type III tires. The Type III tire was developed by B. F. Goodrich engineers to make landings smoother and cheaper. Its larger air volume and lower inflation pressure provide superior cushioning, wear resistance and safety.

And by using dual B. F. Goodrich tires, loads are distributed, tires last longer, safety and economy are increased. B. F. Goodrich engineers have advocated the use of multiple tires for fifteen years. And the first duals used were B. F. Goodrich tires.

Developing tires to meet the needs of today's and tomorrow's planes is a constant project of B. F. Goodrich engineers. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

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THE COVER: Fleet of Navions bought by Arabian American Oil Co. (see story on page 15). Photo by Ross Piz.

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FLYING

JANUARY • 1948

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THE MAIL BOX

WANTS A FAMILY PLANE

I am a member of a flying club. We are incorporated and have 20 shares of stock but no one is content unless he can own a plane himself. I guess I'm sort of average. My yearly income is approximately $3,000. If the market could offer an all-metal ship cruising 100 honest m.p.h. using four and one-half to five gallons per hour and selling for $1,200 to $1,500, I would buy one myself.

A three-place job with a single seat in

back would be preferable. I've heard lots of people say they wished there were a jump seat in such planes as the Cessna 140. In fact, I know one man who has installed one for his small child.

Why doesn't someone think of the family man with a modest income? I'm not an executive; I fly for fun and would like to take the family along.

HOMER L. SMITH

Tucson, Ariz.

ATR REQUIREMENTS

In "Report from Washington" (October issue) is an item titled Pilot Ratings which states that some airlines are seriously considering hiring only men with full airline transport pilot's ratings for co-pilot jobs. You further state that sources in Washington report this to be so. I would like to know the source of your information.

The undersigned has operated an ATR school for over one year and is vitally interested in the trends and opinions of the aeronautical industry in regard to the use and demand of Airline Transport Rated Pilots. This school has graduated 170 pilots to date from the ATR course and feels proud of its achievement in placing a good many of these graduates in good airline jobs with a future.

We have always felt that an ATR should be required for all scheduled and non-scheduled airlines. Little by little it is coming to that. We had hoped that Civil Air Regulations Part 42 would be more forceful on this point.

Since we have been in the pilot instrument training business for 12 years, we can readily see the need for more advanced instrument training for pilots. At present, a pilot with an airline transport pilot rating is more valuable to an airline than a commercial pilot with an instrument rating. Insurance rates lower accordingly when there are two ATR pilots in the cockpit. Slick Airways has been the leader in hiring ATR pilots only. Other non-scheduled airlines are following suit.

We would like to see your all-transport-rating policy become standard. From the safety angle and the economic angle it appears that the non-scheduled airlines are three jumps ahead of the scheduled airlines, both in thinking and practice.

F. A. GAYLORD
Executive Director
Airline Transport Rating Course
Aircraft Associates Flying Service
Long Beach, Calif.

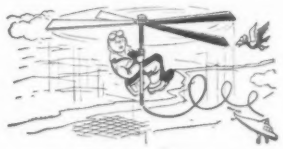
● Indications are that the all-ATR requirements will eventually become standard. FLYING cannot reveal its Washington source for the original item but the facts were thoroughly documented before they were published.—ED.

FIRST HELICOPTER JUMP?

Under "Jottings" (November issue) an item stated that a doctor who jumped from a helicopter at Hamilton Field, Calif., was the first to use a 'chute from a helicopter.

I think if you check with the Coast Guard headquarters in Washington you will find that an Ensign Greathouse and his mechanic bailed out of an old Sikorsky helicopter over Philadelphia in the latter part of '45 or '46.

This was no stunt as the rotor head



came off and I understand they didn't even wait to open the doors but jumped right through the Plexiglas. I think you'll agree that this would be one of the first, if not the first.

JOHN C. REDFIELD

Princeton, Ind.

OMITTED FROM SCHOOL LIST

Your magazine is so popular with Spartan students and employees and your article "Here's Your Ground School" (September issue) such an excellent one that we feel very neglected in having been omitted from the table of commercial ground school courses.

If the questionnaire that you sent out for the information reached us, we do not recall it because it would have been considered an obligation to return it. Since

(*Continued on page* 92)

1. The great new Stinson for '48! In your choice of two 4-place models. The Stinson Flying Station Wagon, pictured here, carries four people and 100 lbs. of baggage . . . two people and 440 cargo-lbs. . . . or pilot and 640 cargo-lbs. Cruises at 130 m.p.h. at 5,000 ft. with new non-stop range of 554 miles.

TO BUSINESS AND PROFESSIONAL MEN ..... FOR '48

Stinson makes 3 important announcements!

THE new Stinson 4-place planes for '48 are here . . . stepped up in speed, range and payload.

And along with these "fly-anywhere" utility planes, Stinson announces two carefully-planned programs for acquainting *new* thousands of business and professional men with the extra comfort, safety and time-saving values of personal flying . . .

- To prove the comfort and the safe simplicity of personal flying, Stinson offers free flight instruction to business and professional men, under its new Executive Flight Instruction Plan.
- To prove the convenience, safety and time-saving advantages of Stinson travel, Stinson will fly you on one of your routine business trips, without cost or obligation to you.

Plan now to see Stinson for '48—on display at your Stinson dealer's. And today, mail the coupon for full information on Stinson plans for introducing personal flying to business and professional men!

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2. Free flight instruction—up to and including solo—is offered to a limited number of business and professional men. You learn quickly, easily and safely under Government-approved instructors.

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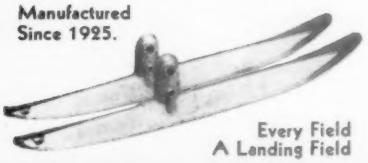

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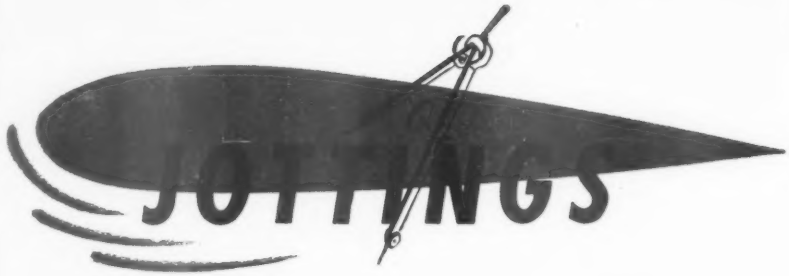

. . . **Flight recorders** must be installed in all United States flag aircraft engaged in scheduled operations by June 30, 1948, T. P. Wright, Civil Aeronautics Administrator, has announced. The new instruments will be superior to those used up to June 9, 1944, when the recorder requirement was repealed because of lack of materials.

. . . **A nationwide program** to improve scheduled domestic airline operations has started with the inauguration of a new traffic pattern in New York City. La Guardia Airport handles the majority of north-south traffic and Newark Airport has the majority of east-west traffic. New York was selected first because the Air Transport Association operations department found that conditions in the New York area affect 40 to 60 per cent of all instrument flights. The new segregation plan will eliminate nearly all cross-traffic on the New York airways.

. . . **Fifty-one civil aircraft models** made by 25 manufacturers are listed in the 1947 directory of U. S. civil aircraft prepared by AIA. This includes four helicopters. The 1946 directory listed 29 companies with 47 models. The latest directory shows nine companies offering 18 different multi-engine models, including two cargo designs. Eighteen companies are producing 29 single-engined models, including 10 four- and five-passenger designs. In addition, as the directory went to press two companies were about to announce specifications on two new four-passenger models.

. . . **Gulf's seventh annual air tour** originally scheduled for January has been cancelled. Reason given by Maj. Al Williams, manager of the aviation sales department, is the present unparalleled demand for petroleum products. Inaugurated in 1937, the Gulf Air Tour was an annual event until the beginning of the war. It was resumed again last year when more than 3,000 pilots from all over flew to Florida, with Gulf furnishing free gasoline and oil.

. . . **A private "dream plane"** is being built by students at Northrop Aeronautical Institute with co-operation of the school authorities. Now in the fabrication stage, the lightplane has unusual features. The cabin arrangement permits pilots and passengers to step into the plane from the ground as easily as entering an automobile. The plane will be a pusher type with the propeller mounted between twin booms.

. . . **Standard runway lengths** have been put into effect by the Civil Aeronautics Administration under Regulation TSO-N-6. Six categories have been set up as follows: for feederline stops, 3,500 feet; local stops on domestic airlines, 4,200 feet; express stops, 5,000 feet; deluxe stops, 5,900 feet; international ports of entry, 7,000 feet; and international express stops, 8,400 feet. These lengths are for sea level with an average temperature of 59°.

. . . **Douglas Skystreak tires**, made by Goodrich, combine the smallest size and highest inflation pressure ever used on

the main wheels of a plane. The tire, a 20x4.4-inch width, eight-ply nylon cord, carries 175 pounds air pressure per square inch. (See photo above.)

. . . **Television** was recently used to observe tests of high-thrust rocket motors at the Aerojet Proving Ground, Azusa, Calif. This new method, which was worked out by Aerojet engineers and General Electric Co., brought the view as close as two feet to observers seated comfortably in a conference room far removed from the test pits. Observations heretofore had been made only at long distance because of the danger. A close-up view by the television camera also allows the engineers to detect in time to stop the test firing any evidence of fuel leaks or other malfunctioning.

. . . **Boeing's first B-50** is to remain in Seattle as a flying laboratory now that the last B-29 (the *Andy Gump*) has been retired. Engineering tests will include engine and component performance at high altitude, evaluation of the new thermal anti-icing system for wings and tail, speed, and aerodynamic investigations at various gross weights. END

8 Big-Plane Features

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On the airlines it is *safety first,*
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Deluxe equipment listed in this ad costs about $500 extra. Immediate delivery.

The Swift 125 gives you 8 of the features that make the big airliners safe and efficient.

Feature	Commercial Airliner	Swift 125
All-metal Construction	V	V
Low-wing design	V	V
Retractable Landing Gear	V	V
Hydraulic Flaps	V	V
Hydraulic Shock Absorbers	V	V
Navigation Lights	V	V
Variable Pitch Propeller	V	V
Oil Cooler Radiator	V	V

No other 2-place personal airplane gives you ALL of these features.

Swift means thrift

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—HERBERT B. SYKES,
Chicago, Illinois

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Ex-Air Corps Major
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Ernest H. Buehl,
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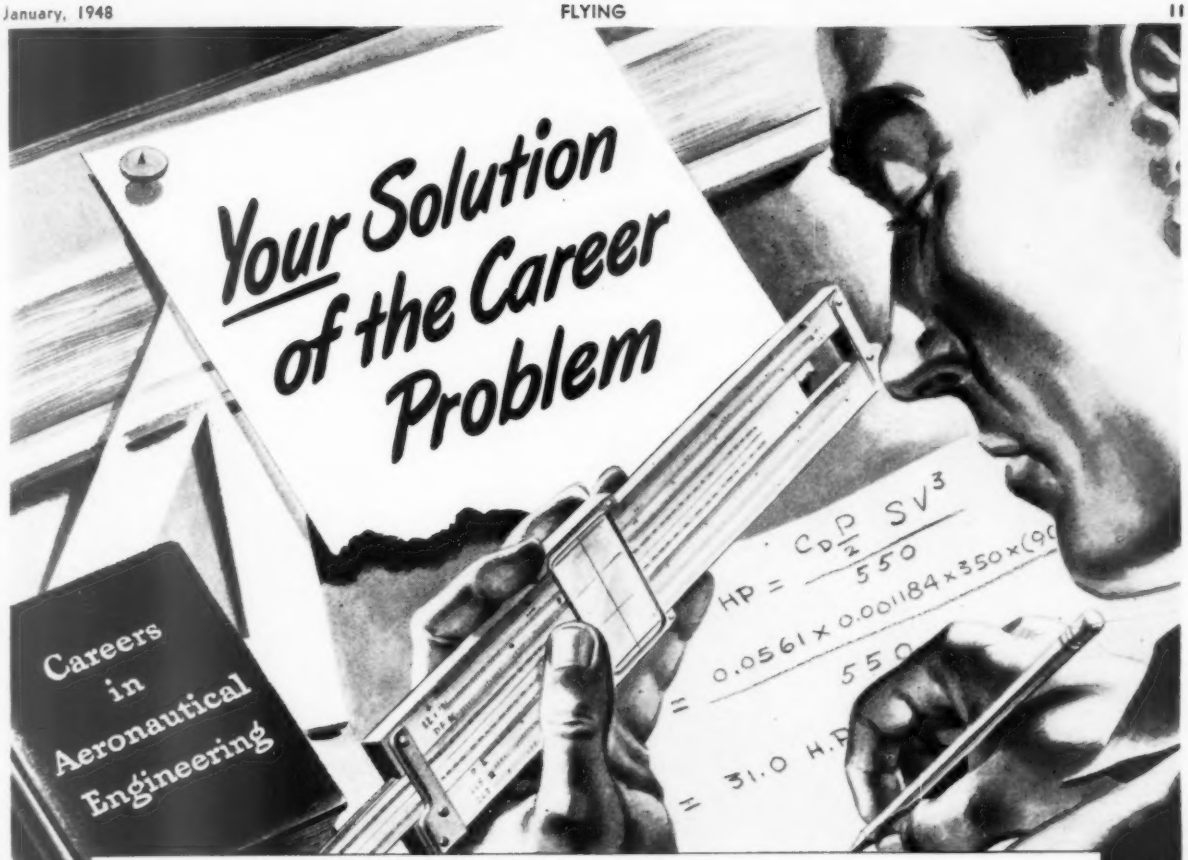
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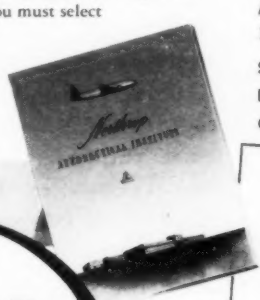

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APPROVED FOR VETERANS

Tyrone Power, Cesar Romero and Director Henry King

on location in Mexico during the filming of the 20th Century-Fox technicolor picture

"CAPTAIN FROM CASTILE"

Cortez flies to Mexico

WHEN 20th Century-Fox undertook the filming of "Captain from Castile" *right where it happened* in the rugged mountains of Mexico, it faced some appalling transportation problems: four to six days' travel time between each of the three main locations, and an operating cost of $60,000 a day!

But Henry King, director, simply added a 200-mph twin-engine Beechcraft Executive Transport to the staff. The trip between each location—Morelia, Uruapan and Acapulco—was reduced to 50 minutes! The Beechcraft flew actors, supplies and technicians between these historic "stages" on a moment's notice.

"The Beechcraft was all-important to us in making this picture," says Mr. King. And in many other American industries similar records are hung up by the Beechcraft Executive Transport every day. Its prime purpose is the quick and efficient transportation of personnel and materials on a company's own schedule and between a company's own selection of destinations, whatever they may be.

Nearly 400 corporations are saving time and money with Beechcraft transportation. For a catalog describing this twin-engine Beechcraft, just write today on your business letterhead.

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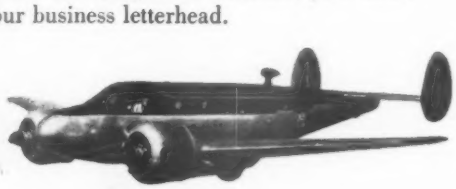


FLYING
JANUARY
1948

Fat, Rich and Insecure

FOR months FLYING has been calling attention to the desperate weakness of America's air defenses. We have pointed out that the very arguments used to advance the Marshall Plan to the American people imply a grave world situation, hardly less serious than that which faced us in the late 1930's.

In a world of violence and international hoodlumism, against which we are daily warned, neither cajolery, argument, name-calling, nor dollar-spending can take the place of weapons and skilled military organization. If the arguments advanced for the Marshall Plan are correct, it is unmistakably clear that the number one task of this nation is to guarantee its security by every physical means at its disposal. The fundamental policy of any nation in a crisis is that of living through it and coming out in one piece.

This policy may be berated as a return to the sorry principles of power politics rather than those of international sweetness and light. However such an argument is of doubtful value when a powerful and ruthless aggressor is loose in the world. It is the premise of the Marshall Plan that such an aggressor exists in the shape of Soviet Russia.

How are we to be protected? When our statesmen shoot off their verbal firecrackers, it seems plausible to believe they are choosing weapons from the wrong arsenal. Can we buy our way out of this dilemma by underwriting the bankrupt nations of Europe, who will do nothing for themselves, and who are devoted to principles of state planning antagonistic to our own? At best they are a doubtful asset and questionable friends. Moreover, our policy in this regard already has failed miserably. Since the end of the recent hostilities, the United States has expended an estimated nineteen billion dollars on this international boondoggling program. The result has been only increased chaos, more intensified Marxist schemes of nationalization, and a cynical demand on the United States for more funds to support them.

The whole view is completely unrealistic, and is unsupported by any of the suppositions of this era of international lawlessness.

Moreover, it appears certain that we have learned little from the past, and are staking our future on a totally false conception of the nature and techniques of modern military struggle.

Under circumstances of war, the sole retaliatory weapon by which decisive force can be brought to bear against a powerful and distant adversary, is the Air Force. All other elements are purely auxiliary. The idea of armies and navies operating under separate areas of jurisdiction arose from circumstances of combat which no longer apply. The Army no longer can strike a first blow, nor can it move until the Air Forces have played out their appointed role of tearing enemy installations to bits. Nor can the Navy inhabit waters under the guns of first-class hostile aircraft. In any new war, it will be found that necessary as they might be in their place, the Army and Navy have become only adjuncts to the air, from whose operations the primary decision must flow.

No portion of this realization is present in our security preparations. Not only have we starved the armed forces as a whole, but we possess a vastly mistaken conception of their future role. Witness the recent solemn statement by the well-known political commentator, Walter Lippmann, "that the advance of communism into Western Europe was stopped when we sent the battleship Missouri to the Eastern Mediterranean." That was supposed to have intimidated the Russians and to have caused them to realize "that the Red Army was outflanked in Europe, and that we knew the way to the vital and vulnerable heart of the Soviet Union."

The incontestable fact is that in the event of war, the Russians will overrun Europe and the Middle East in a matter of days. If the battleship Missouri, or any other battleship, is caught in the Mediterranean, its goose will be cooked in short order.

Our method of retaliation will not be to attempt to land men in Europe, which would be virtually suicidal. It will be to follow a pattern clearly disclosed in the Pacific theatre during the closing days of World War II —that of dropping unending tons of demolition materiàl on the enemy nerve centers and strategic installations, softening him up for the kill, while at the same time preventing hostile aircraft from visiting a like rain of death upon our own cities.

Since the end of the military phase of World War II, weapons, carriers and fighters have become incomparably more efficient and destructive. Transport techniques and tactical operations are increasingly linked to the superior mobility of the air, so that whole armies and their supply trains now promise to be airborne.

This is the grim lesson which modern military theory makes blazingly clear; our primary defense is not a land,

Continued on the following page

sea, or dollar defense—it is an air defense.

The attempt at coordination between separate and equal Army, Navy and Air Force elements, desirable as it was a few years back, no longer is functionable under conditions of war. For reasons of training, tradition, techniques, procurement and planning, a coordination of the fighting services based on their equality with each other will prove inadequate and unsound. This was shown beyond question in the recent Exercise Seminole, where the Army, Navy and Air Force endeavored to cooperate in resisting a simulated aggression along the Florida coast. As could be expected, the coordination was poor. The staff work, viewed as a unit, was inadequate, and the whole plan of operation inefficient. Against a powerful and real aggressor, the operation would have bogged down miserably.

In the military situation of the United States, separated from its only possible adversary by a comparatively narrow terrain of Arctic snows, the dominant and controlling role can be played only by an armed force on wings. The only economical and competent military body which can essay the task of protecting American security, is a unitary (not "unified" force of diverse elements) airborne force, skilled, highly-trained and completely in command of its own ground and sea auxiliaries.

Under the circumstances, the desperately deteriorated position of our present Air Force is appalling. It now consists of some 300,000 officers and men, and lives for the most part out of stock supplies left over from war contracts. A stringent economy applies in all directions. To maintain the barest security, the Air Force last spring requested 70 air groups and $8,000,000,000. This was cut to $3,310,500,000. B-29 engines which were operated with a compression of 30 pounds per square inch during the war, today must operate with 50 pounds per square inch because that is more economical. When the Air Force Materiel Command has to meet this figure, it is discovered that of 1,300 engines on hand, only 200 qualify.

Temporary buildings on Air Force bases are falling apart. There are no funds available to put up permanent ones. Training facilities have been cut to a minimum. Orders for new planes are minuscule. Less than 300 of the vastly superior B-50's, B-36's and B-35's are on hand. Plans call for replacing medium bombers with jet bombers, yet none have gotten beyond the testing stage. As for the pursuit ships, the only known production order for jet fighters is for the P-84, of which about 500 are on order. Even such items as P-80 crash helmets cannot be secured because there is not money to pay for them.

The shrunken 15th Air Force, as an example, has approximately one-third of the authorized number of airplane and engine mechanics, and is even worse off for specialized mechanics in radar, instruments, propellers, armaments, electronics and communications.

The same situation applies to the once glorious NATS and ATC, which have disintegrated into skeleton organizations.

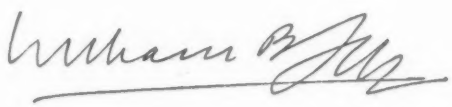
Even worse is the condition of the supporting aircraft industry. For normal peacetime security purposes, the Air Forces require at least 3,000 modern operational aircraft annually. In the present state of the industry, it is doubtful if much more than one-half of this requirement could be met.

In a recent statement to the President's Air Policy Commission, which every intelligent American should read, Major General Oliver P. Echols remarks that "an air force *in being* is of little value unless it is supported by an industry which can supply it with modern equipment in adequate quantities at the time required." General Echols declares that there is a steady deterioration of existing air equipment due to the policy of underreplacement based on the current "economies." Progress on new and advanced types, rapidly rendering wartime equipment obsolete, is lagging. Echols points out that "no airplane used in World War II was developed during the war. All had been started on their way from the drawing boards prior to the war, and only now are the planes developed on the basis of war experience and changed strategic conditions being brought into limited production." Questions of testing, evaluation, possible redesign, as well as tooling for mass production, represent further time-consuming and costly engineering problems, so that it is more than doubtful that any swift expansion of our present limited production capabilities could be expected if we were to meet with a sudden emergency.

To bring the American aircraft industry in position where it can support, with the full power of American productive genius, the military enterprise of the nation, would require not weeks or months, but long years. "Therefore," says General Echols, "we must realize, and must bring the American people to the realization, that when attack comes, our defeat is inevitable if our *immediate* ability to produce is not equal to our minimum requirements for a successful defense." This means that our aircraft industry must be able to meet the strategic requirements of the Air Forces almost immediately upon the onset of hostilities. Otherwise, we will mobilize for war under conditions of frantic and desperate anxiety, with normal rates of attrition rapidly reducing us to impotence.

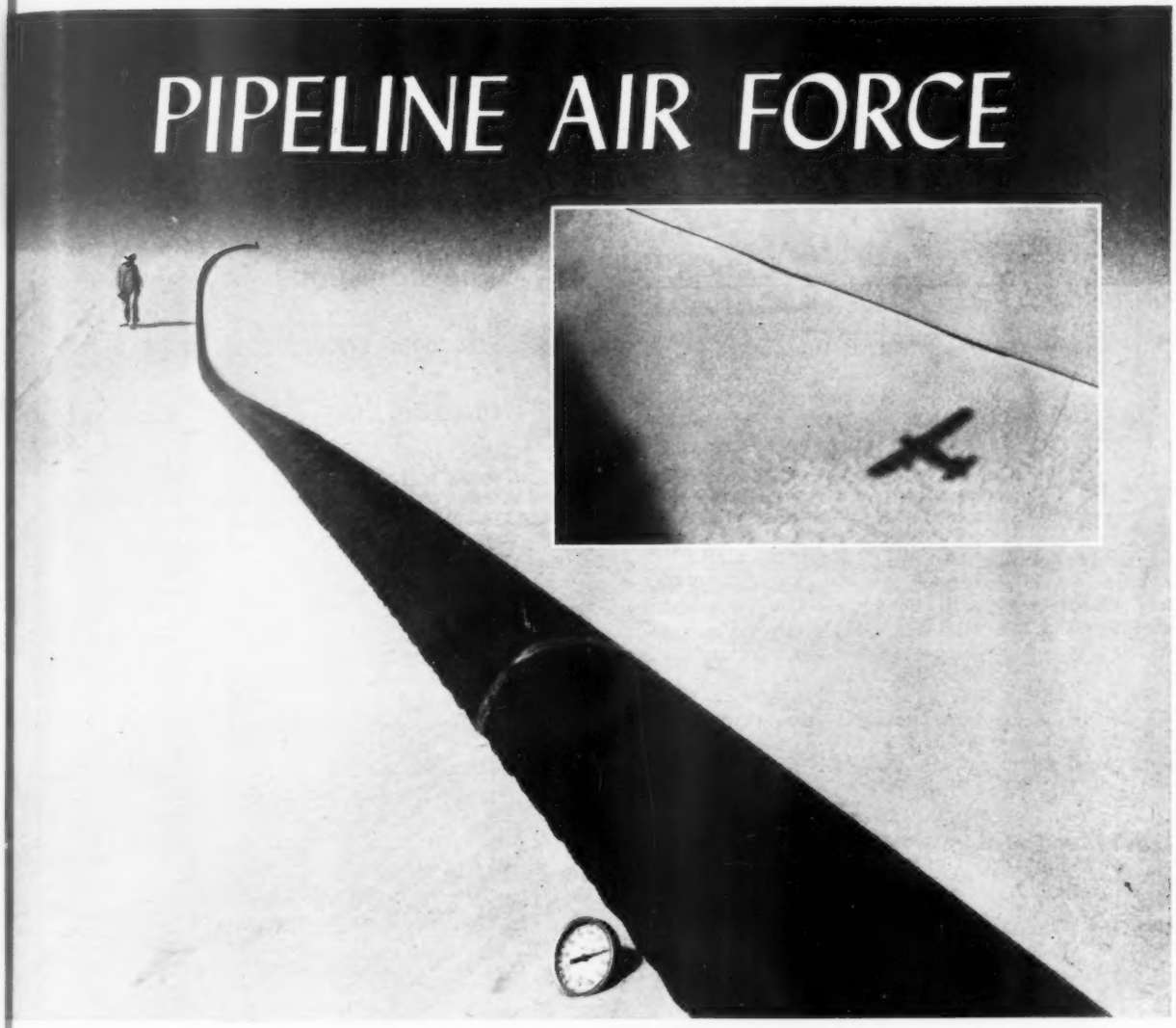
If America is to be safe, it must awake to its responsibilities, and recover its historic character of alertness and hard common sense. America can be both secure and prosperous if it elects to use its resources wisely and well in its own defense. By siphoning our funds to the failing Marxist economies of Europe while demolishing our essential defenses at home, we simply give truth to the famous couplet of the poet Dryden:

"For those whom God to ruin has designed,
He fits for fate, and first destroys their mind."



William B. Ziff

PIPELINE AIR FORCE



Planes speed inspection of the pipelines that snake along the Persian Gulf. Previously, Arabs trekked on foot over the hot sands to check for leaks. Noorduyn Norseman (inset) streaks along section of pipeline, accomplishing in hours what was formerly done in weeks.

Five Navions join air fleet operated by U.S. oil company in the Saudi Arabian desert.

By C. B. COLBY

THE FIVE *NAVIONS* on FLYING's cover will soon be winging over Saudi Arabia's oil fields, burnished bright by abrasive wind-driven dust and buffeted by giant thermals that boil upward to more than 10,000 feet over the boot-shaped chunk of desert between the Red Sea and the Persian Gulf.

The small monoplanes are the latest addition to an "air force" that's literally so hot you can fry eggs on its wings.

Aramco (trade name for Arabian American Oil Company, owned jointly by The Texas Company and the Standard Oil Company of California) bought the *Navions* to supplement a fleet of 14 other planes that operate over their 450,000 miles of Saudi Arabian oil concessions—as well as the entire globe at times.

The four-passenger planes will be used for high-speed inspection of hundreds of miles of pipeline which snake along the Persian Gulf coastline like giant varicose veins. They'll also come in handy for courier chores and for spotting the stranded vehicles which are occasionally lost along crowflight roads cut out of desert dunes.

(*Continued on page* 80)

Don't Sell Private Flying Short

By PETER ALTMAN

Ex-professor of aeronautical engineering, Mr. Altman was director of the manufacturing research department of Aviation Mfg. Corp., Vultee, and Convair, 1940-1943. He was the first registered aeronautical engineer in Michigan and now has his own private consulting practice.

The lightplane market is stronger than most people realize, this analyst says.

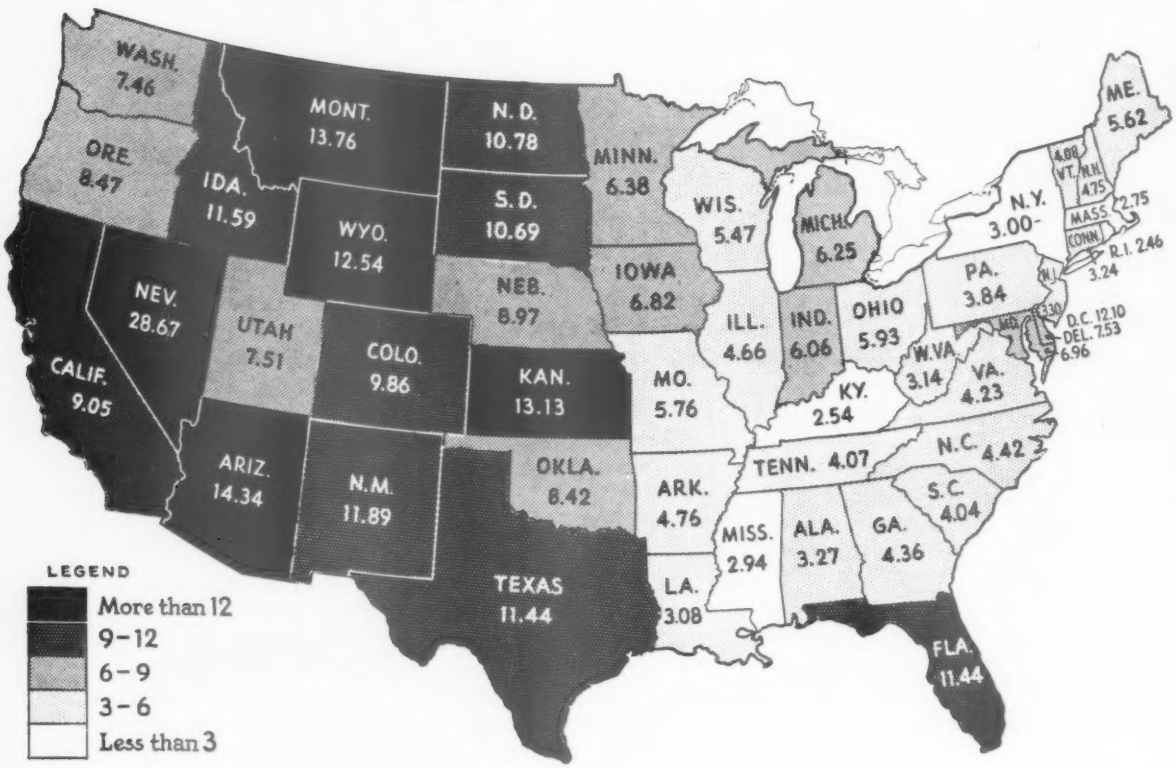
THE LIGHTPLANE industry is being panicked by the same group of characters who 18 months ago were predicting an airplane alongside every car. It's high time the industry settled down long enough between its mad enthusiasms and deep blues to see itself in calm perspective. The view from the heights might have looked inadequate back in 1946, but in today's deep gloom it gives strong and steady reassurance of a sustained market for personal aircraft in the years ahead.

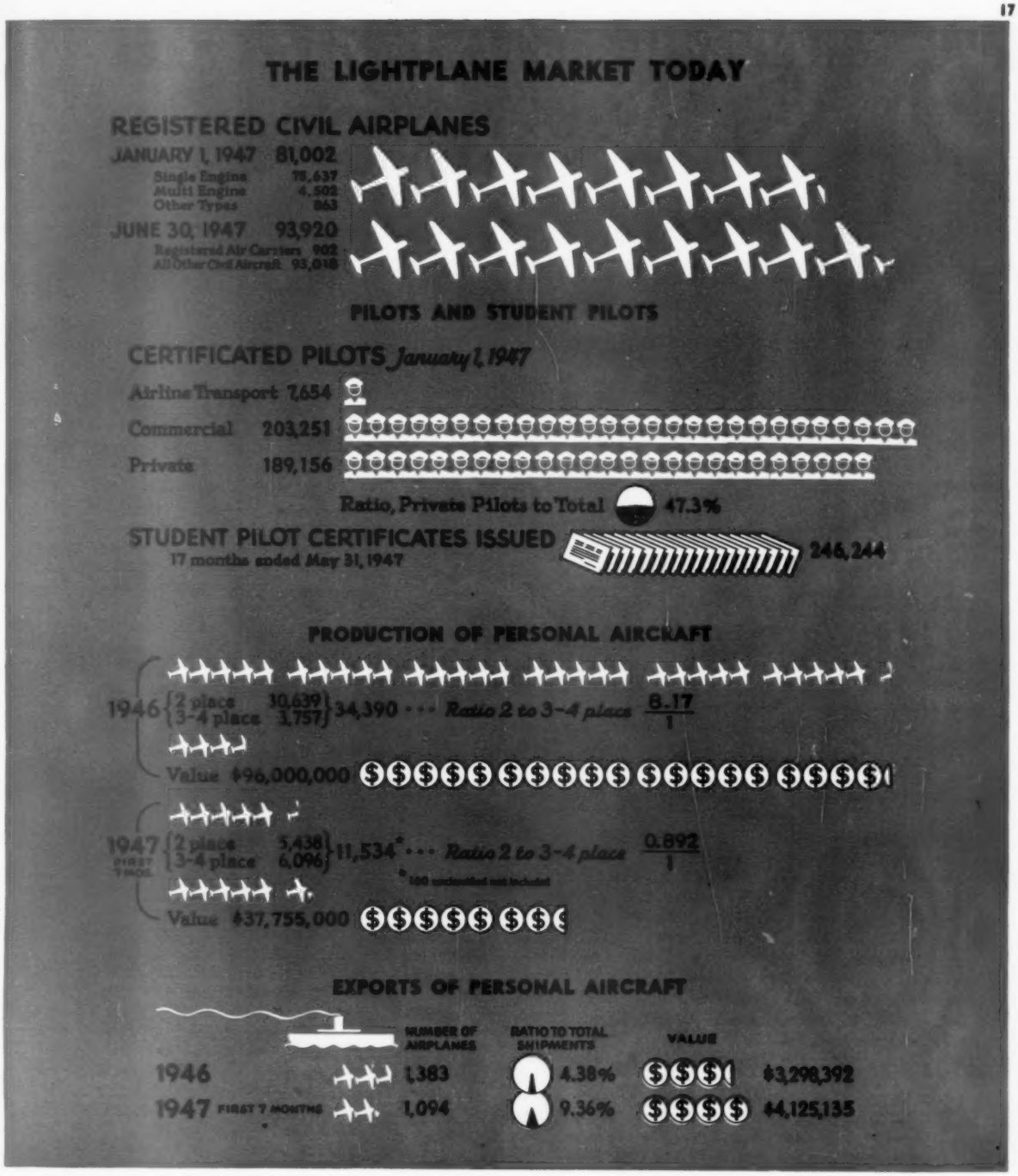
Back in 1946, mistakes were made in over-estimating demand. Everyone was so enthusiastic that too little attention was paid to good planning and a long-range program to increase airplane utility.

But if we reexamine the less spectacular predictions of the CAA in its report, "Civil Aviation and National Economy," we will see that they are fundamentally as good today as when first presented. T. P. Wright, the Administrator of Civil Aeronautics, still firmly believes that a registration of about 400,000 airplanes by 1955 is a good possibility provided the manufacturers, operators and others engaged in the industry fulfill their part of the program. Other competent experts fully agree with him.

They believe that the industry will come through with the necessary design developments, service policies, cost reductions and other important factors that must be accomplished before we can realize the potential market

PLANES PER 100,000 POPULATION



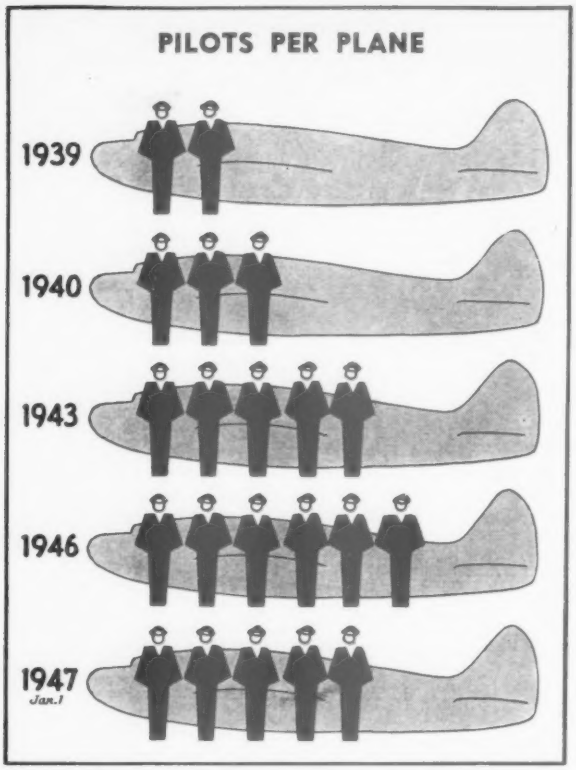

THE LIGHTPLANE MARKET TODAY
REGISTERED CIVIL AIRPLANES
JANUARY 1, 1947 81,002
Single Engine 75,637
Multi Engine 4,502
Other Types 863
JUNE 30, 1947 93,920
Registered Air Carriers 902
All Other Civil Aircraft 93,018
PILOTS AND STUDENT PILOTS
CERTIFICATED PILOTS January 1, 1947
Airline Transport 7,654
Commercial 203,251
Private 189,156
Ratio, Private Pilots to Total 47.3%
STUDENT PILOT CERTIFICATES ISSUED
17 months ended May 31, 1947
246,244
PRODUCTION OF PERSONAL AIRCRAFT
1946 2 place 30,639 3-4 place 3,757 34,390 Ratio 2 to 3-4 place 8.17 / 1
Value $96,000,000
1947 FIRST 7 MOS. 2 place 5,438 3-4 place 6,096 11,534* Ratio 2 to 3-4 place 0.892 / 1
* 100 unclassified not included
Value $37,755,000
EXPORTS OF PERSONAL AIRCRAFT
NUMBER OF AIRPLANES
RATIO TO TOTAL SHIPMENTS
VALUE
1946 1,383 4.38% $3,298,392
1947 FIRST 7 MONTHS 1,094 9.36% $4,125,135

Mr. Wright and others envision. A careful review of the facts supports this view.

Many reasons have been presented for the decrease in number of airplanes produced and sold in the first half of 1947 compared with 1946. Many analysts believe that the principal factors are temporary over-production, widespread uncontrolled sale of war surplus airplanes, the lack of suitable hangar and service facilities, and the high cost of operation.

In 1946 the industry built a total of 34,390 airplanes below the 400-h.p. class. This represents 9.62 times as many as were built in 1939 and 5.32 times that of 1940. In addition, the best estimates show that the Government sold about 32,000 war surplus airplanes. This resulted in a total of over 66,000 airplanes added in 1946. The CAA prediction, based on a 30 per cent annual growth, 20 per cent annual replacement and 25 per cent export market, indicated a production of 18,800 airplanes for 1946, 24,400 for 1947 and 31,600 for 1948. Estimates made by the author, allowing for the "pent-up" demand and increased manufacturing facilities, showed an accelerated production for 1946, 1947 and 1948 of 28,000, 42,000 and 43,200,

DETROIT PUBLIC LIBRARY



Ratio of pilots per plane is one index of aircraft demand. Chart shows larger ratio of pilots today—hence more demand.

respectively. The combination of new production and sales of surplus war airplanes for 1946 exceeds the total of 1946 and 1947 as predicted by the CAA and is 136 per cent greater than the 28,000 airplanes assumed by the author based on the accelerated demand.

The industry's over-production in 1946, coupled with the large number of war surplus airplanes sold for civil use, produced an upward swing in airplane ownership which could not possibly be maintained because of the lack of facilities and the stabilization of the demand for airplanes to be used for the veterans' training program. Consequently, the obvious result was a downward trend to permit the introduction of useful airplanes and facilities for individual, business and family use. As is usually the case, the downward swing goes below the normal value.

The over-production in 1946 had another very detrimental effect in that many of the manufacturers were carried away by their enthusiasm in a buyer's market. Afraid they would not be able to obtain the necessary materials for their anticipated production, they greatly overstocked or made purchase commitments on firm orders which could not be cancelled without incurring high cancellation charges. This condition put many of the manufacturers in a difficult cash position, requiring drastic curtailment in development activities and in some cases forced them into bankruptcy.

The bright side of the picture is that the better organized and experienced manufacturers have benefited from the experience and have reorganized their staffs and their plans to operate on a more realistic program in regard to the growth of the industry and the type of equipment required.

The wholesale value of the 31,594 new personal airplanes produced by the 12 manufacturers reporting to the Aircraft Industries Association in 1946 was $88,172,000. In addition, the U. S. Facts for Industry reports show another 2,796 personal airplanes not included in the A. I. A. data, which makes a total of 34,390 personal airplanes below the 400-h.p. class.

Accounting for these additional airplanes, the wholesale value is approximately $96,000,000 and based on an average distributor-dealer allowance of 25 per cent, the retail sales value would be $128,000,000.

If the sale of service parts and special equipment added by the dealer is included, it becomes obvious that the personal airplane sales business had a very good volume in 1946 and throws some light on the over-enthusiasm of most of the manufacturers and the over-stocking of materials and supplies already discussed.

Production of personal airplanes in 1947 in both numbers and dollar value is well below 1946. However, the volume of business is not altogether so bad that the industry has to issue cries of distress.

Up to the end of July, 1947, the manufacturers reporting to the A. I. A. shipped a total of 11,695 airplanes for a wholesale value of $37,755,000, which represents a retail value of approximately $50,000,000 for the first seven months, or an average monthly wholesale value of $5,393,571. In 1946 the average wholesale monthly value was about $7,340,000. In comparison, 1947, therefore, shows a decrease of only 26.5 per cent in dollar value. However, in number of airplanes produced the decrease is much greater. The average monthly shipment for the first seven months is 1,671 airplanes compared with an average of 2,866 airplanes per month in 1946 based on the total 12-month period, a decrease of 41.7 per cent.

The difference in the two values is due primarily to the increase in sales of four-place airplanes.

A number of encouraging signs have appeared recently, such as a realistic revival of enthusiasm on the part of manufacturers and dealers, well-organized sales programs, a continuing demand for four-place airplanes, the growth of the flying farmer movement, the re-establishment of manufacturing facilities and sales organizations for three popular airplanes, two of which are in the two-place class and one in the four-place, and well founded reports that several established manufacturers will soon announce new four-place business and family-type airplanes in the moderate price field.

Accounting for these conditions, and using the average figure for the first seven months, it appears that the industry should produce about 20,000 airplanes for the whole year, having a wholesale value of $64,800,00.

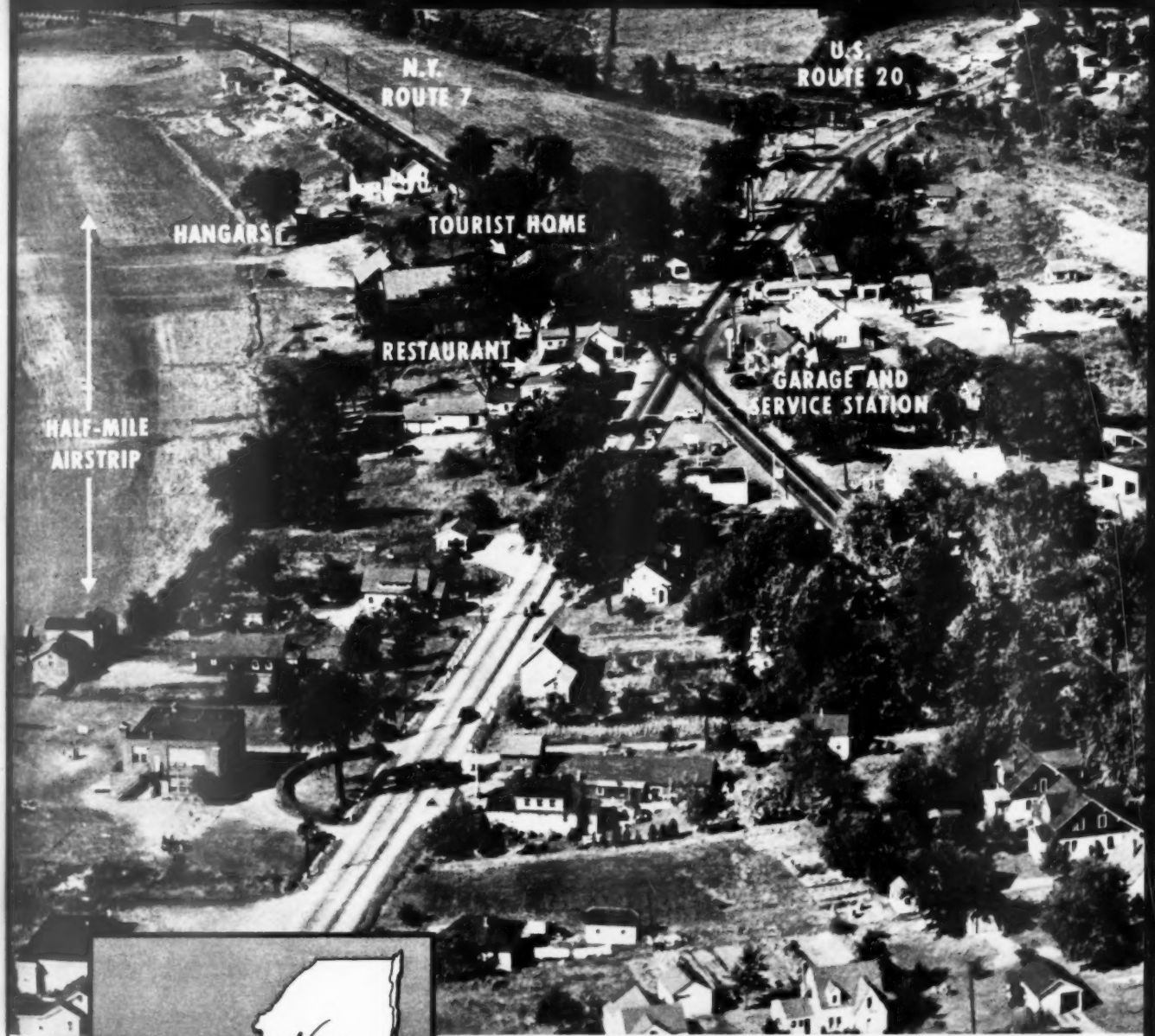
Airplane and pilot registration stands at an all-time high, and has had a steadily increasing growth since V-J Day. According to the records of the Civil Aeronautics Administration, there were 93,920 airplanes registered as of June 30, 1947, of which 93,018 were civil aircraft used for purposes other than air transport. This represents an increase of 12,918 since January 1, 1947.

The CAA records also show a total of 400,061 certificated pilots on January 1, 1947, of which 189,156 were in the private pilot classification and 203,251 in the commercial classification.

The ratio of pilots to airplanes is favorable. On January 1, 1947, the ratio was 4.94 as compared with 6.05 at the beginning of 1945 and 5.7 at the beginning of 1946. The average ratio in the pre-war period from 1930 to 1938, inclusive, was only 2.19. The present high ratio will continue to decrease as the veterans training program stabilizes and more and more of the student group either purchase airplanes individually or through club affiliations.

The high ratio of pilots to airplanes provides a good indication of the potential market, especially if the first cost and operating costs of air- (*Continued on page* 78)

THE AIRPLANE COMES TO *Duanesburg*



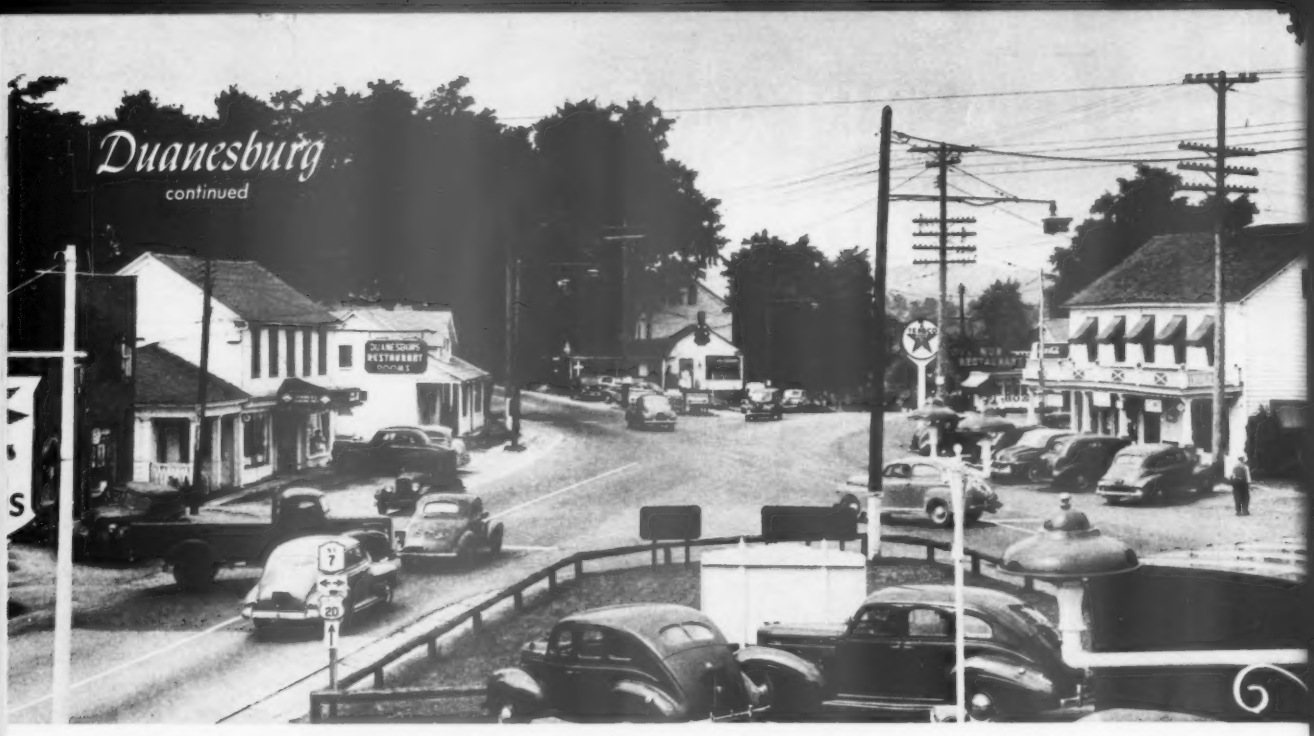
Duanesburg, N. Y., airstrip is one of Gid Wilber's many businesses. He also runs a garage, general store, tourist home and restaurant—and flies a weekly newspaper route.

Nearly 10 per cent of the residents of this village fly, thanks to Gid Wilber.

CONTINUED ON NEXT PAGE

Duanesburg

continued



Duanesburg's busy intersection is converging point for traffic, where U.S. Route 20 (left foreground) crosses N.Y. Route 7 on its way across America. Wilber's airstrip lies behind trees to left, just across road from his garage and store (behind columned building, right).

By HAL VON LINDEN

TWENTY-FOUR hours after his first plane ride Gid Wilber had bought a Piper *Cub*, negotiated for land and had a bulldozer flattening the contours of a cow pasture into a half-mile airstrip.

Within 36 hours the windsocks went up.

Many of those who grinned weakly or were silent at that first *Cub* tied in his Duanesburg, N. Y., backyard two years ago are listening proudly around village supper tables tonight as Junior tells about his after-school hop when he "hit the turf on three wheels, level, and held it there."

"Gid will tackle anything," they say of Wilber—and explain that it was 20 years ago (when Gid was 18) that he took over the service station where U. S. 20 crosses N. Y. 7, a busy intersection a few miles west of Albany, N. Y.

Opinion then was that he should have opened up three miles out. No overhead.

"Or business either," was Gid's laconic answer, "you sell gas where the cars are." His daily sales have topped the 2,000-gallon mark.

"If there's a future in the air," he now argues, "the little fellow will get his share close to heavy arterial traffic. Duanesburg has that."

It was with the same idea that he added a garage and store to the service station. And then bought a restaurant because he missed lunch one day when all three eating places were shut.

"There ought to be one beanery open in a town [pop. 250] of this size," he believes. The Wilber tourist home followed when an out-of-state party could not get accommodations for the night in Duanesburg.

Before the hangars were up at the airport, Gid brought in 24-year-old E. J. Berical, veteran ETO fighter pilot who had gone into more than 50 (*Continued on page 87*)

Airmarked garage and general store identify town in nine-foot letters. Wilber also owns restaurant and a tourist home.

One of town's 23 flyers (10 per cent of population) waits as instructor pulls chocks. Another student and his family watch.

Wilber's planes include Cessna and two Cubs. An Aeronca and another Cub (not in picture) are owned by local flyers. Landing strip in background is half mile long and was bulldozed from meadows and pastures paralleling highways. Note "T" hangars.

With Gid propping the Aeronca, his brother-in-law Chuck Mott starts a flight. Other local farmers also fly between chores.

The boss works, too. Gid gases up Aeronca, based at the airstrip.

Advice before solo is given Dick Croote, 17, by Instructor Berical.

Delivering Sunday papers, Gid tosses newspaper (circle) to rural subscriber. He likes to show "air age" advantages.

Daily check on airplanes is made by Mechanic Woodrow Bellinger.

Bertha Wilber, Gid's 14-year-old daughter, is his youngest student.

Businessman-pilot E. M. Greb liked Fly-It-Yourself, later bought plane.

Fly-It-Yourself personnel exhibits firm's airplanes (right): four Ercoupes and one Luscombe. From l. to r., Howard Freese and Charles Denham, instructors; Phyllis and Bill Saunders, and Ivan Ashleman, instructor. Ercoupe (below) is most popular plane used on Fly-It-Yourself jaunts.

Pin-pointed territory of M. R. Pasley is covered in rented plane.

Plotting course for plane, Phyllis Saunders helps Flyer C. M. Grannon.

FLY-IT-YOURSELF

By MAX BURK

Young Bill Saunders follows dad's career — with airplanes, not autos.

A NINE-year-old lad watched eagerly one day in 1929 as 100 gleaming Arrow *Sport Pursuit* open-cockpit biplanes were delivered at the Kansas City, Kan., Fairfax airport. The planes were a shipment to aviation's first rent-a-plane service, the Saunders Fly-It-Yourself system.

The youngster's father, Warwick Saunders, and his uncle, Ellis, shelled out $3,500 apiece for the planes—but many of them never turned a prop. For just as the business got underway, the depression rocked a nation which at best had few qualified pilots.

But the nine-year-old boy was impressed. And today, William Saunders—discharged from the Army Air Forces and married—is operating the country's only Fly-It-Yourself service. The problems that faced his father and uncle have evaporated, and in April, 1946, young Saunders started a successful business (Saunders Fly-It-Yourself System) at the Kansas City, Mo., Municipal Airport. He rents both Luscombes and *Ercoupes*.

His business is distinguished by the fact that he rents planes for long periods of time—from several days to several weeks.

Two hundred seventy-four of his customers have used Fly-It-Yourself planes on trips to Mexico City, (*Continued on page* 60)

Dad and son have same problems. Young Bill (Fly-It) gets help from father, Warwick (Drive-It) Saunders who ran a Fly-It-Yourself in 1929.

Over New Jersey plant, C-47 with load of parts heads for Teterboro airport.

AUTO PARTS-RUSH

Air transport comes to rescue when auto parts shortage hits Ford eastern plants.

FACED with plant shutdowns because of auto parts shortages, Ford Motor Company officials have kept assembly lines rolling through use of air transport deliveries. Shipments are shuttled nightly between Dearborn, Mich., and the east coast by Meteor Air Transport, a company owned and manned by ex-Army flyers and ground personnel. Sometimes two loaded transports fly the run in a single night, carrying everything from gas tanks to hoods and glass. The sturdy planes—converted C-47's—carry up to 6,000 pounds apiece. Meteor's Army-trained staff, including Bob Morrow, ex-Air Transport Command pilot, is used to tough going. All are instrument pilots and have logged thousands of hours flying globe-girdling wartime ATC routes. President Morrow, 38, flew heavy aircraft ranging from B-24's to B-29's during the war.

Besides Morrow, Meteor has eight pilots and eight mechanics, including Bob Collins, 26, who flew *Spitfires* in the Battle of Britain before transferring to the AAF; George Baldwin, 24, who piloted B-24's over Germany; and Chief Pilot Ken Johnson, 26, who was a Troop Carrier pilot in Europe. They keep three converted C-47's in the air for a combined total of more than 100,000 miles monthly. Other Meteor cargoes have included dresses and shoes, lobsters, fish, pumas, snakes, ring-tailed monkeys, flowers, blueberries, mushrooms, and bathing beauties. END

Faced with shortage of auto parts, Ford officials decide to rush an air shipment to east coast plant.

Loading air freight at night, shippers pack urgently needed gravel deflectors into truck at Rouge plant dock. Driver will meet incoming transport at airport.

Ready with deflectors, driver Jack Gallagher finds Meteor transport already discharging its load of dresses. Flyer at rear doubles in brass as stevedore.

Arriving at Teterboro, N. J., Pilot Bob Morrow (left) checks manifest with Ford's P. J. Kearns.

Parts reach plant just in time to meet daily production needs. Truck pauses momentarily for gate clearance at Edgewater, N. J., factory as workers arrive.

Assembly line rolls ahead as workers at the plant install one of the airborne stone deflectors on a new automobile.

DESERT WATCHMEN

Flying bloodhounds track missing persons in the Arizona wastelands.

Planes search desert for lost persons while bloodhounds follow tracks on ground. Hound (below) clambers out of plane, ready to take up trail of a lost youngster. Dogs are rushed to scene before scent becomes cold.

By TOM HAYES

SOMEHOW the thought of bloodhounds is always coupled with the picture of Simon Legree chasing poor Eliza across the ice. Few know that in this age of speed even the lop-eared bloodhounds take to the air—but not to track down lawbreakers. They fly missions of mercy.

Yearly, scores of people—adults and children alike—get lost in Arizona's scorching desert. The sheriff's office in Tucson used to have a difficult time tracking down those wanderers until a volunteer air posse was organized. A list of volunteer pilots was left with the sheriff. Whenever a lost person was reported, the sheriff rang up one of the boys, and from far and near the pilots came flying—literally.

Occasionally this air posse has been used to iron out a law-enforcement program. With the flyers' help a hideout of some car thieves and highjackers was discovered in the desert mesquite. But lost person calls are still the predominant type of call, and pose certain problems. Unless the lost person is still alert enough to wave to the searching plane, even the keenest and most diligent pilot will miss him. In the desert, an exhausted man can easily

Bloodhounds ready for search are held by their trainer while the pilots are briefed at the airstrip by police officers.

Bloodhound finds trail of lost child, after being flown to scene of search. Deputies on horseback follow the dogs closely.

PHOTOGRAPHS BY ROSS MADDEN

appear to be only a bump on the ground, or one of the countless shadows made by the barrel cactus or rocks.

Then someone remembered a pack of bloodhounds at the Florence penitentiary, 60 miles from Tucson. The hounds were trained to track down runaway criminals. If transportation could be provided for them, what was to prevent the dogs from joining in the search—and trailing on the ground while the planes cased the area from the air?

Warden Lon Walters and trainer Dan Moore gave their approval. They promised to lend the hounds whenever the need arose. Moore suggested another reason why the combination of plane and hound is desirable: Even though most of the penitentiary bloodhounds are fine cold trackers, they cannot defeat the obstacle presented by a completely dead track. The track goes dead if exposed too long to sun, wind and rain. Frequently, well wishers mill around the place where the lost person was last seen and completely efface his track, leaving only their own—and nothing for the bloodhounds to trail. It is important to get the hound to the trail's starting point as quickly as possible, preferably within 24 to 48 hours.

Arizona provides no special funds for extra-curriculars such as finding missing dudes, and the program is made possible entirely through the largesse of voluntary pilots and Dan Moore. On trips of this sort they pay all their own expenses including food, plane maintenance, fuel, lodging, horses and, if needed, truck.

The hunt usually starts when Tucson Sheriff Martin radios Warden Walters at Florence, Ariz. Walters, in turn, alerts Moore. Moore gives orders to a trusty to saddle a horse, or if it is to be an aerial trip, to load the selected bloodhounds in a truck to be driven to the airport. Since the terrain over which the hounds trail is usually rough, a horse is provided at the other end, where the plane lands. A good hound can easily make 50 miles a day and the only hope of keeping up with it is on horseback.

Because such "chases" are likely to be lengthy, Moore carries with him only minimum equipment. That usually includes a sack of jerky for himself and the dogs, a six-gun, a canteen of water and a pair of wire clippers to cut fences before his horse and the hounds. When a hound runs a hot track, he says, it is so excited it is liable to step on a snake or (*Continued on page* 62)

Saved by air-ground team, the tiny wanderer rides home on a deputy's horse. She heard the bloodhounds' baying.

Back in plane, Trainer Dan Moore and bloodhounds will be flown back to the kennels at the Florence penitentiary.

This is Private Flying

SECOND OF A SERIES

Rosemead Airport in Los Angeles area had no tail tie-down, and ropes were frayed, yet charged $1

Most western airport operators don't know what good line service means, FLYING survey pilot discovers.

By GEORGE E. ANDERSON

BETTER LINE SERVICE is one of the greatest needs of private flying. It simply has to be made better if the airplane is ever going to escape from the dreary routine of flying around an airport and really go in for cross-country. The quality of line service met by the average pilot away from his home airport strongly affects his attitude toward all private flying. Multiply his reception by tens of thousands of pilots and you have a mass attitude toward aviation which isn't helping it one bit.

Judging by what I encountered on my survey trip for FLYING, line service at half the airports in the country is wretched. As I write this I have had a chance to observe line service at 48 airports in the southwest, Pacific Coast and in the northwest, plus five more on a side trip to Wisconsin and the Michigan Upper Peninsula. This article is the result of these observations.

The author has been a pilot since 1940, an A&E since 1941. Because of his experience in checking "gripe" airports for AOPA, he was asked to make the survey on which these articles are based. During the war, Anderson worked on WTS and CPT programs, later was an engineer on B-29 engine nacelles and control surfaces. He is now maintenance director for an eastern aviation firm.

In the December issue of FLYING I discussed general service. In subsequent articles I will describe what happened to the Luscombe when I asked for maintenance.

The purpose of my trip—probably the most extensive survey of its kind ever undertaken—was to find out just what the average cross-country flyer must contend with in the way of service and maintenance.

I found that only about half of the airports I stopped at give reasonably good line service.

The other half I rated fair to poor.

There is no doubt that the poor service at some airports directly harms the business of all airports, good or bad, and of all aviation.

Since I am in charge of non-scheduled line maintenance for my own company, I feel qualified to speak with some authority. Sure, I know that a good many operators beef that there's no money in servicing an occasional itinerant pilot. I've had them tell me that they can't keep an extra man standing around on the off chance that some cross-country plane is going to fly in and buy gasoline.

That is a poor excuse for giving rotten service, as any good businessman will tell you. (*Continued on page* 66)

Farewell sign and automobile-type service typify businesslike operation of Bellflower Airport in Los Angeles area. Tag on instrument panel (left) informs the author that his gasoline tanks have been filled, his oil and tires checked, windshield cleaned and entire plane dusted

Skyway One is America's best defined aerial artery, containing half of all the airmarkers in the United States.

Highway in the Sky

By CLINTIE KENNEY

AMERICA'S first skyway, the best continuous strip of airmarked territory in the country, should be bustling with air travelers by next summer. And within five years the U. S. should have a network of skyways over which lightplane pilots can travel to any part of the nation.

That's the prediction of Blanche Noyes, CAA's Airmarking Section chief, who led a party of Government officials on a survey of skyway number one early in the fall.

The new Skyway (a Chamber of Commerce project with CAA blessing and cooperation) is a 40-mile-wide strip from Los Angeles to Washington. It is charted along established Federal Airways that offer the best terrain and weather conditions for contact flying. The route extends through areas where non-scheduled service is most needed and where personal flying is popular.

Objective of skyway planners was to give the air traveler what the motorist now has: enough legible markers so that he can know where he is at all times.

Five thousand markers along the coast-to-coast strip was considered ideal. One thousand have gone in. While considerably short of the ideal, Blanche Noyes considers that skyway airmarking has "gone over better and faster than I believed possible." With only 2,000 airmarkers in the entire United States, Skyway One is easily the best airmarked route for private flyers.

In an official report to Civil Aeronautics Administrator T. P. Wright recently, Mrs. Noyes cited advantages which the skyway brings to private flying:

It provides a shot-in-the-arm to nation-wide airmarking projects.

It encourages family flying.

By expanding the utility of the airplane, it gives a boost to the aviation industry.

It offers greater safety and convenience to the private flyer.

"Our survey flight proves that a system of skyways is fundamentally sound and can be of great value in promoting non-scheduled flying," Mrs. Noyes says. "It took 25 years to get a comprehensive system of highways but I think we'll have skyways offering good coverage within five.

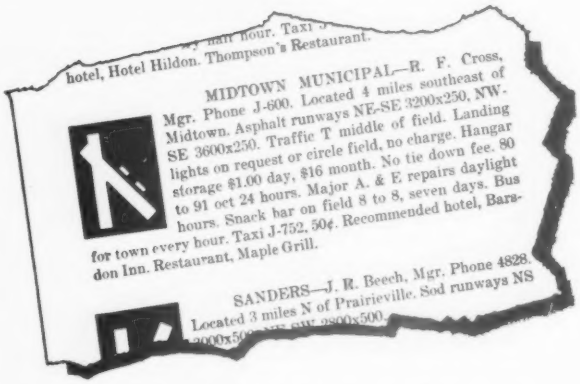
"The skyway is bound to boom family flying. Now the average plane owner can look at his skyway map the way he's accustomed to look at a road map. He can determine the airports and maintenance available, the hotels and points of interest. As additional new skyways are opened up, he can fly anywhere in the United States for his vacation with the same ease and safety that he now drives his car," Mrs. Noyes declares.

In the past, cross-country airmarking has been a spotty effort, hampered by a lack both of sustained work and of funds. The private flyer going cross country would find one section comparatively well- (*Continued on page* 86)

Transcontinental route extends from Los Angeles to Washington, D. C., with alternate airways in the eastern part of the country. Note the difference in Skyway One insignia on the two branches of the eastern route.

CAA's airmarking specialist, Mrs. Blanche Noyes, explains use of special templates for laying out figures and letters. Goal of Skyway One planners is 5,000 markers along the route; 1,000 have already been installed and others will be in place by end of winter.

Cross-Country Guide


hotel, Hotel Hildon. Thompson's Restaurant.

MIDTOWN MUNICIPAL—R. F. Cross, Mgr. Phone J-600. Located 4 miles southeast of Midtown. Asphalt runways NE-SE 3200x250, NW-SE 3600x250. Traffic T middle of field. Landing lights on request or circle field, no charge. Hangar storage $1.00 day, $16 month. No tie down fee. 80 to 91 oct 24 hours. Major A. & E. repairs daylight hours. Snack bar on field 8 to 8, seven days. Bus for town every hour. Taxi J-752, 50¢. Recommended hotel, Baradon Inn. Restaurant, Maple Grill.

SANDERS—J. R. Beech, Mgr. Phone 4828. Located 3 miles N of Prairieville. Sod runways NS

Typical listing in Pilots' Cross-Country Guide has detailed airport information plus a chart of the runways.

"Best 300 airports" are included in a new directory of ports for private flyers.

By CHARLES L. BLACK

Associate Editor of FLYING

TWO ARMY Air Forces flyers stretched their legs on cots in a tent at Loping, China, in 1944. Forgotten was the next day's mission over Jap lines. They were talking post-war aviation.

Said the lieutenant with the Indiana twang: "What we'll need then is something to tell us *where* to fly, not *how*. Someone should put out a 'Duncan-Hines of Aviation'—with all the best airports listed."

And that's the way it started.

Three years later (just a few weeks ago) the first edition of the Pilots' Cross-Country Guide rolled off the presses. And ex-Lieut. Frank Cook of Terre Haute, Ind., leaned back in the president's chair of the National Aero Service to see how a pilot's "post-war dream" would fare in rough and tumble, civilian 1947.

With 300 airports (approximately seven per cent of commercial and municipal airports in the country) listed in the $1 Guide, Cook and his five wartime air corps cohorts have what they think is a unique aviation service. Their 5x7-inch book has over 100 pages, including dope on "N.A.S.-approved" Alaskan airports. Four of the flyers put in over 50,000 miles of cross-country inspection before they issued the Guide; and now they're starting out again, compiling the second edition, which will come out next April and every six months thereafter.

The idea was batted around (*Continued on page* 83)

Planning survey flight for Guide, N.A.S. President Frank Cook (left) confers with Odus Baldridge, ex-Navy flyer and eastern manager.

LOCKED POSITION

Shoulder harness is adjustable and even in free position (below) does not permit pilot's head to hit dash.

FREE POSITION

Safety miracles accomplished by shoulder harness are typified by crash of Navy plane from which the pilot not only walked away but was uninjured.

THE CASE FOR *Shoulder Straps*

A simple safety device, the shoulder harness, has saved scores of military pilots.

By F. R. STOUT

MANY WARTIME Army and Navy pilots are still enjoying the use of their original faces because a pair of canvas straps kept them from being disfigured, or even killed.

The shoulder harness, an adjunct to the ordinary safety-belt, is almost unknown to civilian pilots. In fact, shoulder harness was ignored even by the Army and Navy for more than two decades between the two world wars, despite a fund of statistics proving the high rate of head and upper body injuries in controlled or semi-controlled crashes.

Although an effective shoulder harness was invented by a World War I Royal Flying Corps pilot in 1917, the U. S. Army Air Forces did not adopt the device as standard equipment until December, 1943, nor the United States Navy until June, 1942. At those late dates, comparatively few wartime planes could be provided with this safety aid. But those that saw service were a tremendous boon.

As is frequently the case, the men actually doing the fighting were quicker to recognize their needs than those responsible for supplying them. Recognizing the odds in favor of their some day being forced to ride five or six tons of mangled or dead-engined airplane to earth or sea, fighter pilots worked out their own makeshift shoulder harnesses before they were adopted by either the Army or Navy.

The original shoulder harness was invented in 1917 by Lieut. Oliver Sutton of Squadron 54, RFC. The squadron flew Sopwith Pup single-seat fighters. Even at that

British shoulder harness is modification of original harness developed by Lieut. Oliver Sutton of Royal Flying Corps in World War I.

time the reasons for upper-body crash injuries were obvious, but designing a good harness was not too easy. Obviously, an effective harness must prevent the pilot's head and shoulders from crashing into the instrument panel in a hard landing. It must also allow freedom of movement under all conditions, yet still hold the pilot firmly in his seat. It must be quickly adjustable, and it must be designed so the pilot can release himself speedily in an emergency. British aviation authority Oliver Stewart, who was a member of Sutton's World War I squadron, wrote FLYING recently, giving historical background on development of the first harness. He says:

"Sutton and I were the first men to wear the harness in battle. The first two samples were made by fitters and riggers to Sutton's instructions. Sutton, who was later killed in an airplane accident when test flying, set himself five main objectives: To hold the pilot's buttocks to the seat in all conditions of flight, right way up and inverted; to allow ample turning movement for keeping watch over the tail; to allow limited forward movement for gun sighting; to provide rapid, combined fastening and adjustment to the pilot's build; and to provide a quick release workable in all conditions, especially with the pilot's weight in the straps.

"He achieved all these, and I can personally testify to the last, and most difficult, for I crashed in a single-seat fighter which turned over on its back. With the whole of my weight on the straps, I was able to withdraw the pin and get clear instantly.

"Sutton did not accept the four-strap arrangement without thoroughly investigating the single lap strap or belt. He discarded this because he found no single strap held the pilot firmly on the seat during prolonged inverted flight and strong negative "G." He believed that no pilot could do advanced aerobatics with absolute accuracy unless his seat remained as a kind of fixed point.

"His safety harness, therefore, had its four straps so anchored (to the lower longerons of the early fighters for which it was designed) as to hold down and back. Two of the straps came over the thighs and two over the shoulders to meet at a point somewhere over the navel. When done up tightly they gripped and held the pilot down and back in a manner that inspired immediate confidence and made maneuvering in inverted flight easier than with other forms of belt.

"The attachment of the four straps and the quick release look simple but were only devised after much thought. The straps had holes punched close enough to give an adjustment for pilots of all sizes. The central pin was tapered and the straps were successively placed onto the pin. When pulled tight the taper provided a slight tendency for the straps to slide off the pin. The tendency was slight and a retaining pin, like an old-fashioned wheel linch pin, held the straps in place. Withdrawal of the linch pin permitted all the straps to slide off at once and release the pilot.

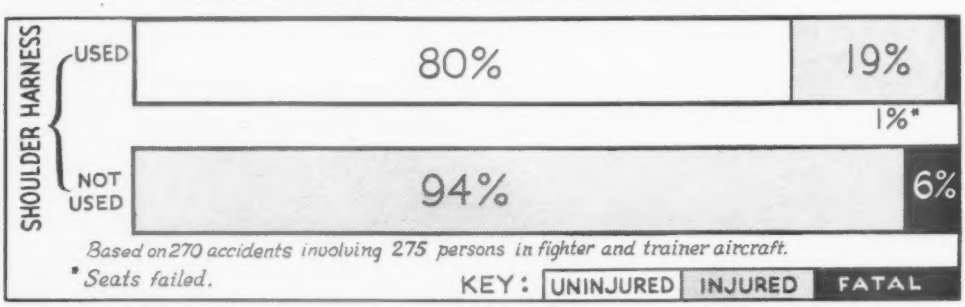
"This original Sutton harness was modified in one or two minor respects but remained fundamentally unchanged. The early modifications were made almost immediately after the first harness was tried and consisted in bringing the two shoulder straps to a yoke behind the back of the pilot instead of taking them independently down to the longerons.

"Sutton was aware that in an aircraft crash the pilot could suffer two kinds of fatal head injury. The high "G" on crash could jerk his head forward and break his neck, or he could have his head flung forward against the gun butts, which in those days were generally on a level with the face. He sought to allow the top of the body to go forward, but not so far that severe face injuries would be possible.

"It is worth noting now the many steps that were taken to find an improvement on the Sutton harness. Almost every year and sometimes more than once a year the Royal Air Force considered a change. One of the things about the Sutton harness which it sought to change was the method of using a series of holes in the straps for adjustment.

"Repeated attempts were made to introduce buckles, like those used in suspenders, instead of holes. And now the latest form of harness, the (*Continued on page* 85)

SHOULDER HARNESS SAVES INJURIES AND LIVES



Mountain 'Copter

By DON MUNDAY

Western Vice-President, Alpine Club of Canada

WHEN Charles Shiverick, Cleveland, O., mountain climber, was killed by an avalanche on an inaccessible peak of the Coast Range in British Columbia, a helicopter was called upon to bring out the body for burial. I was asked to join Dr. Neal M. Carter in a bold attempt to land on the 16-mile-long Tiedemann Glacier, which seemed the logical route for our unhappy task.

We flew in a Noorduyn *Norseman* to the head of Bute Inlet, where we found that Vernon Montgomery and Carl Brady of Seattle had already landed in their Bell helicopter. They had found only one possible emergency landing place—even for a helicopter—along the rugged shores of the 40-mile-long fiord. Montgomery took Carter with his pack and ice axe to the glacier on the first trip and then I boarded the 'copter, which (*Continued on page* 64)

Bell helicopter piloted by Carl Brady comes in for a landing on Tiedemann Glacier to pick up the author.

Leveling a landing spot for the helicopter is Dr. Neal Carter, alpinist, who with the author, attempted to bring out body of a dead mountain climber.

'Copter Pilot Carl Brady was one of two pilots to land on the Tiedemann Glacier in British Columbia's coast range.

AIR SHOW

CARTOONS BY FRANK ADAMS

AIR show patrons are usually described either as aviation bugs and thwarted aces, dreaming of what might have been, or blood-thirsty maniacs, out for a Roman holiday. Frank Adams doesn't seem to feel either of these descriptions is apt. His fans do not flock worshipfully after each devil-may-care pilot-hero, neither do they stand breathlessly by, hoping the old coffee grinder will conk out or a wing will collapse. They are basically just average citizens at the county fair. Last week it was elephants, today it is airplanes. It's all a show to them. END

"I think I've sunburned my tonsils."

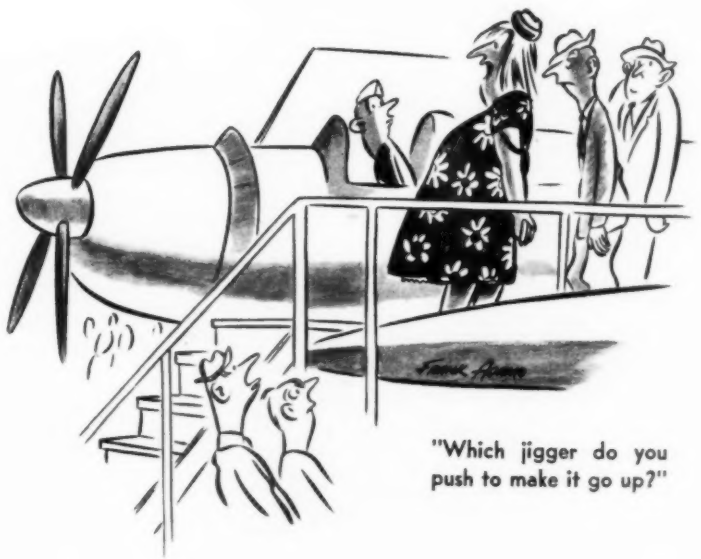
"It has a wing span of 33 ft. 4-9/16 in., length of 27 ft. 5-13/16 in., height 8 ft. . . ."

"Friends, this lucky little lady has just won a free airplane ride in the big new . . ."

"Why didn't you think of that at home?"

The Parachute Jump.

Ex-Air Force Pilot.



"Which jigger do you push to make it go up?"

Rose Manzini listens to Bank Cashier, Stuart Gifford explain terms of flight training loan, while Operater Ed Lyons looks on.

On the job, Rose is private secretary to A. T. Gregory, chief engineer of the Ranger Aircraft Engine division of Fairchild.

Rose's instruction starts on the ground. Chief Maintenance Man James S. Day briefs her on checking oil in a Piper Cub.

Cross-country flight planning comes after Rose is no longer airport-bound. Instructor Frank Winter is helping plot course.

First solo comes fairly early in the flying course. As her instructor sends her off, Rose knows she has hard hours of learning ahead before she earns private license.

Ground school is mixed with good times at weekly meetings of Nassau (County) Aero Club which Rose (at corner of table) joins.

Charge-Account Flying

You can buy a car on the installment plan, why not learn to fly on credit? It works for Ed Lyons.

PHOTOGRAPHS BY BEN ROSS

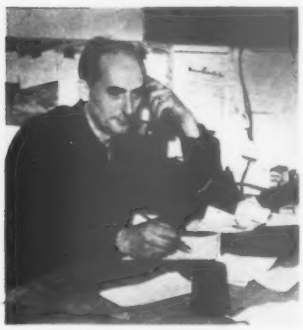
WHEN 23-year-old Rose Manzini decided to learn to fly, she was dismayed to find that it would cost her nearly $500 to earn her private license. Rose, who in business hours is private secretary to A. T. Gregory, chief engineer of Ranger Aircraft Engine division of Fairchild, had a talk with Ed Lyons, operator of Lyons Flying Service, Lindenhurst, L.I., N.Y. Here she found a unique plan of financing a flying course.

Under the Lyons plan, a complete course leading to a private pilot's certificate, including 50 hours of ground school and 45 hours of flying, costs $493.60. The plan is financed through the Babylon National Bank & Trust Co., Babylon, L.I. All the prospective flying student needs is a steady job. No down payment is necessary. The $493.60 is split into 14 equal monthly installments of $32.91 each, and a 15th installment of $32.86.

The Lyons Flying School pays the interest charges of six per cent on the loans. "It's worth the money to me," says Operator Lyons. "I get my money in one lump sum and don't have to worry about a student having to raise an occasional $5 to $10 for a lesson at irregular intervals. The student concentrates on his lessons, comes down to fly regularly, and completes the course as quickly as possible. Lots of people buy cars on time—now they can learn to fly in the same manner. Now almost anyone with a job can learn to fly."

Rose Manzini agrees. "This is about the only way I could ever hope to fly," she says. "This way I fly regularly. I know my instruction time is there and I don't have to worry about scraping up money for a lesson. Sure, I have to pay the bank, but knowing what it is I can budget myself properly." END

Cruiser disabled, Owner Chet Gibson radios the repair service.



Repairman Jack Flagler gets details over his radio-telephone.

Seattle seaplane rushes repairs to disabled yachts in the Puget Sound region.

Tools assembled, after checking his records of Gibson's cruiser, Flagler climbs aboard float Taylorcraft for take-off from his dock on Lake Union.

Flagler's seaplane locates Gibson's cruiser "Hilma III" from the air, lands, and taxies up to the craft. Gibson is waiting to toss Flagler a line.

REPAIR-BY-AIR MAN

By LORINDA MISKELL

JACK FLAGLER had been operating a marine repair service in Seattle, Wash., for some time before he got his brainstorm. Jack's reputation as a marine mechanic was well known to boat owners in the Puget Sound area, but even so his business required no more than himself and a helper. And then, one day, he got his IDEA.

A distress call came in from a cruiser stalled out on the sound and the skipper had only a day left for his cruise. Flagler guessed at the boat's location and gave him an estimate of two hours before he could get there in his power boat. And then it occurred to him to rent a plane and fly to the cruiser's aid. He had been flying for four years—that was no problem. And in less than 30 minutes he found the little craft bobbing helplessly on a choppy sea 10 miles off shore.

A quick inspection revealed a burned-out condenser which Flagler replaced immediately. Within a few minutes the boat's engine was running smoothly and Flagler was taxiing about for a take-off. After a couple such incidents, Flagler decided it would be good business to buy a 65-h.p. float Taylorcraft.

Before long he had built his business up enough to employ six men. His charges are on a flat hourly basis, including the use of his plane and services. He already has plans for buying a larger plane to enable him to carry heavier parts and more passengers. Flagler keeps complete files on all pleasure craft in the area, including the type of engine and parts used. Most of the boats carry radio-telephone and he can be on his way to aid them much faster than an automobile tow-car to a disabled automobile. His only regret is that he didn't start his "repair-by-air" business sooner. END

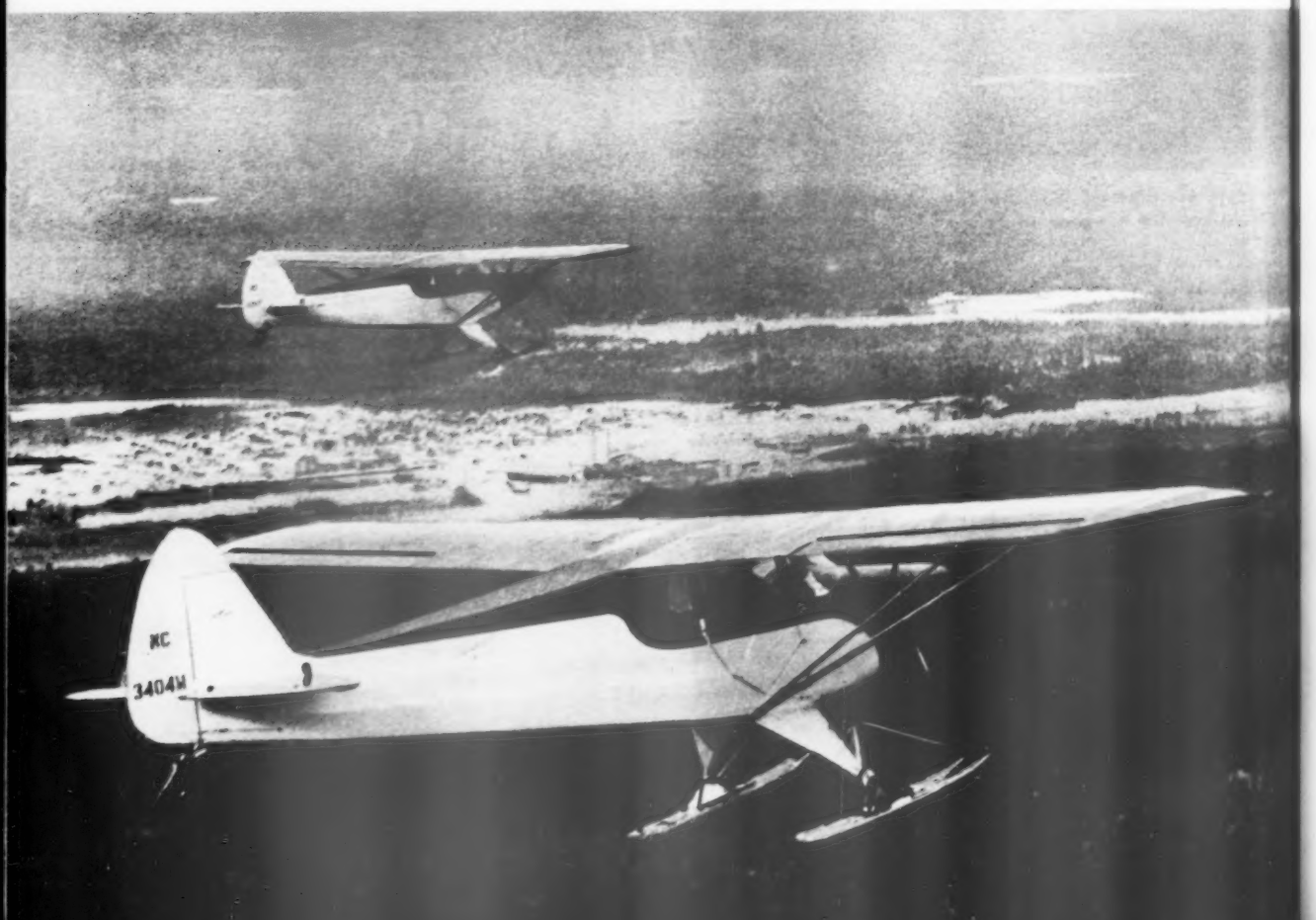
Seaplane is hauled up to stern of Hilma III while Flagler on float prepares to climb aboard. The combination of radio-telephone, with which most Seattle boats are equipped, and airborne repairs, means unusually prompt service. One problem is to locate disabled boats.

Expert Mechanic Flagler has brought along tools and necessary repair parts. It doesn't take him long to verify trouble and fix engine.

She works! Gibson waves farewell to Flagler as he takes off beside yacht. Time saved by plane permits operator to service more boats.

Sky Wardens

Three of Maine's sky wardens are (l. to r. above) Bill Turgeon, a 15,000-hour pilot, Bob Blackstone and "Sleepy" Atkins, standing in front of their ski-equipped Piper Super Cruisers. Below, Turgeon and Atkins fly north from Millinocket on a game patrol.



Trained woodsmen-pilots patrol the air over Maine wilderness in unceasing hunt for poachers.

By ROBERT ELLIOT

THERE WAS SNOW in the air on a gray November day over Aroostook County, Me., when State Pilot Bill Turgeon, a veteran of 15,000 hours, brought his four-passenger Stinson down on Cross Lake to pick up Game Wardens Cassius Austin and Curtis Cooper. Maine woodsmen say they would rather have the devil after them than square-faced "Cash" Austin, only 5 ft. 6 in. tall but weighing over 200 pounds.

Turgeon's French accent was more pronounced than usual as he turned to Austin. "Where do you want to go, Cash?"

"Ross Lake. Somebody's trapping beaver there in the flowages."

Bill nodded. The plane taxied up the lake, turned into the wind and came bouncing back over the choppy waves. Bill rocked her a few times to test her weight, then took her upstairs. Over the vast unbroken wilderness of northern Maine they sped, the wardens alert, scanning the woods, streams and lakes below.

Shortly, Long Lake showed below on their right and Umsaskis showed to the left. There was Priestly Mountain, rising 1,900 feet, with another lake sprawled behind its base. Now the private road from Churchill Lake to Lac de la Frontiere, Quebec, Canada, lay behind and Ross Lake was in sight.

Routine checkup of ice fishermen is made by flying game wardens on Millinocket Lake. Wardens spotted fishermen from air and landed to inspect their licenses.

"Get them fast, Cash," Bill urged after they landed. "We'll have solid freeze any day now. I've got to get these pontoons off and put this plane on wheels."

Cash nodded.

"I'll come back tomorrow and look things over." With a roar the plane took off and Austin and Cooper turned into the woods.

Few words passed between the two wardens. They located the flowage seen from the air and found a large number of (*Continued on page* 94)

Snow sled powered by a propeller is helpful to use in conjunction with planes. Warden Al Cummings, Millinocket, is at wheel.

Aerial tramway used by skiers and tourists nears summit house on Cannon Mountain at Franconia, N. H.

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A FLYING Holiday

NORTHERN *New Hampshire*

Skiing and tobogganing await flying visitors to White Mountains

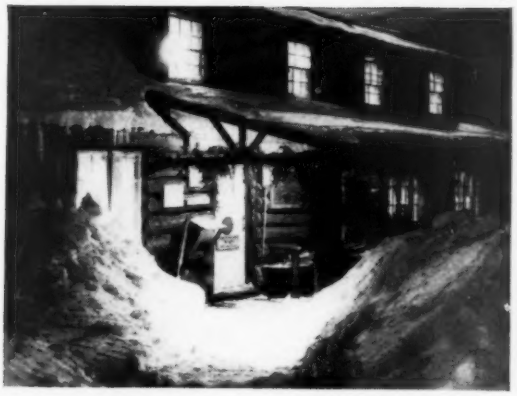
THE WHITE MOUNTAINS region of New Hampshire is one of the most highly developed winter sports areas in the eastern part of the United States. Dominated by 6,288-foot Mount Washington, the tumbling, rolling country is easily accessible to flyers.

Take your choice of skiing, tobogganing, skating, iceboating, snowshoeing, ski-joring, dogsled racing, or just plain watching. Most people prefer skiing, and crisscrossing the area are hundreds of miles of trails, varying from gentle beginner's slopes to contest courses for which even the most expert have a healthy respect. There are scores of tows, lifts and ski jumps, as well as warm cabins, inns, and farmhouses. Most of the big skiing developments also provide skating rinks, some of which are floodlighted for night enjoyment.

For the spectator there are winter carnivals, ski jumping and racing contests, horse and dog races and similar attractions. For instance, there is the famous Dartmouth Winter Carnival at Hanover. These events are announced in metropolitan newspapers, and the State Planning and Development Commission, State House, Concord, New Hampshire, has a recreational calendar available for the asking which lists many of them. Ice-fishing by ski-plane on the many lakes is another—but very cold—sport. Often several planes at a time can be seen on famous Lake Winnipesaukee, which forms the approximate southern boundary of the mountain area.

A well organized information system makes it easy to plan a trip to the White Mountains. The best and most useful booklet of all is "The (*Continued on page* 88)

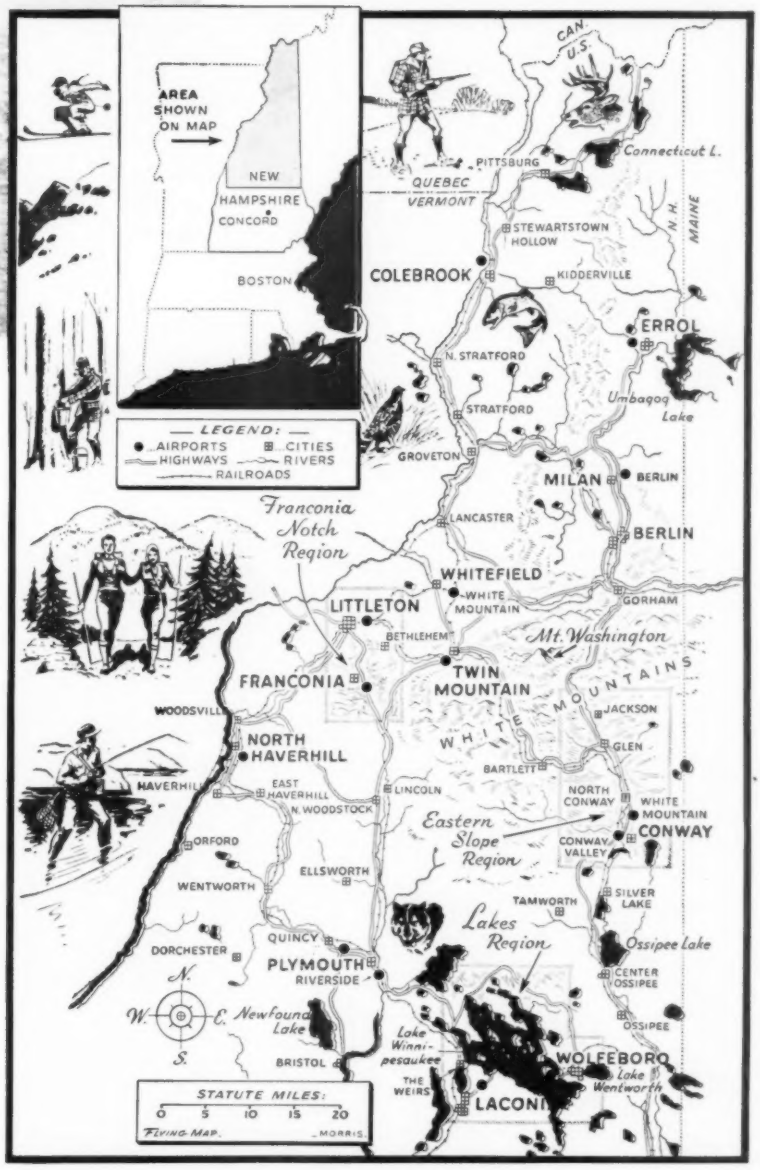
This series of articles has been planned for the private pilot who knows the boredom of flying around in his local traffic pattern. Whether he has two days or two weeks to spare, the pilot can get great utility from his airplane; there are hundreds of places to go. Readers who have gone on a FLYING *Holiday are urged to write, telling how they like it, and what changes they suggest.—Ed.*

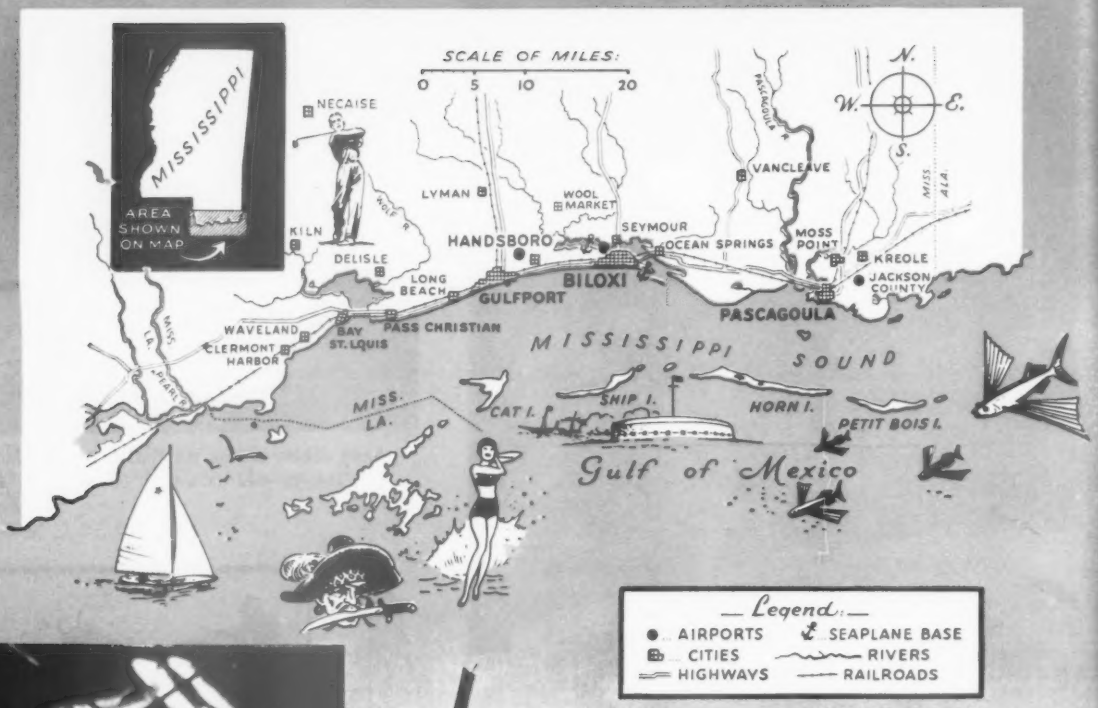


Snug cabins such as the Pinkham Notch AMC camp dot snow-covered mountains in the skiing country.

Cannon Mountain skiers use this trail through forests. Photograph shows type of terrain over which pilots in area fly.

Dog sledding on winding trails is a favorite New Hampshire winter sport.





Speckled sea trout abound in Gulf bays. These beauties were caught near Biloxi.

Salt water fishing from amphibians or seaplanes is easy in sheltered coves near the shore but for real deep water sport special boats are needed. Cost is about $50 per day.

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Fishing on inland lakes and rivers of Gulf coast gives the flying vacationer a chance at bass, bream and crappie waters.

Mississippi Gulf Coast

MISSISSIPPI'S 90-mile long share of the Gulf of Mexico's water is the state's oldest region in point of history and one of its newest vacation areas for light-plane pilots. This coastal section, too sandy to support much agriculture, was known as far back as the 16th century to white men such as Hernando De Soto and Father Marquette, and for many years saw the balance of power shift from one nation to another.

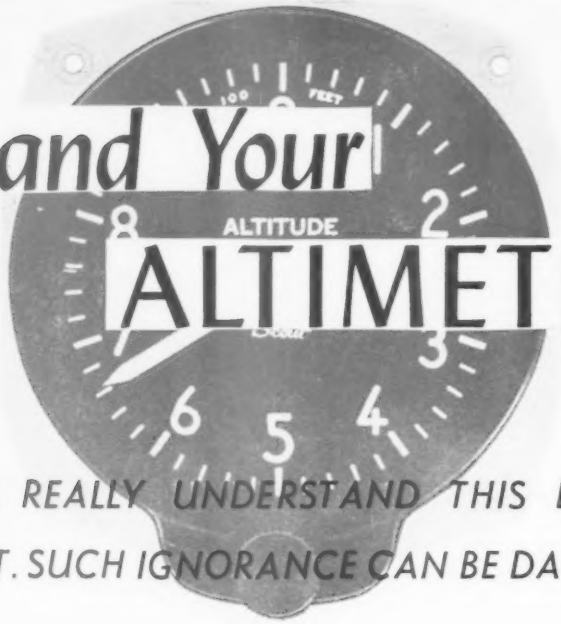
Separated from the Gulf by a fringe of long, narrow islands which form Mississippi Sound, the cities of the region have become well-known resorts. While not tropical, the climate is mild enough to encourage year-round outdoor activities such as fishing, boating, golfing and touring. With the exception of a few midwinter chilly spells, swimming can be enjoyed around the calendar. Hunting is good from October to February, and there are centrally located airports which can give the FLYING vacationist good service.

The first permanent white colony was founded in 1699 when Pierre Le Moyne, Sieur d'Iberville, and 200 followers established Fort de Maurepas at what is now Ocean Springs near Biloxi. Under the French rule several other settlements were made, including New Orleans. In 1763 France ceded all her possessions east of the Mississippi River to Great Britain and shortly thereafter the real tide of immigration began, principally Englishmen from the Carolinas, Georgia and Virginia. When the Spanish conquered West Florida, which (*Continued on page* 91)

Sailboats cruise the year-round in coastal waters. Biloxi yacht course (above) is near two seaplane bases.

Oyster boats ride at anchor in Biloxi's Back Bay Harbor. Boats for deep-sea fishing can be chartered here.

You and Your ALTIMETER



FEW PILOTS REALLY UNDERSTAND THIS ESSENTIAL INSTRUMENT. SUCH IGNORANCE CAN BE DANGEROUS

By ROBERT W. PRESCOTT, Jr.

THERE is no point in glancing at your altimeter without knowing what it is telling you. Although this is a standard procedure, it is dangerous. Too often the intersection of mountains and airplanes piloted by fuzzy-minded and careless flyers has brought disaster.

The way to avoid rocks is to measure correctly your height above them. This involves a definite procedure. And the proper application of this procedure requires familiarity with a few basic facts and relationships.

During the war we had singularly good luck in teaching central and south Pacific natives to tell time. We could check out a Philippine Moro on a GI watch in two or three hours. Provided he could count to 60, read numbers aptly and acquire a muscular apprehension of the hour, minute and second hand he could be sent out on a patrol with instructions to return when the big hand is at the top, the middle-sized hand is at the bottom and the hour hand is halfway between top and bottom on the left.

This altimeter shows the pressure altitude of its home field (small triangles), which is 1,920 feet. It is indicating 5,060 feet. The indicated altitude is uncorrected for temperature but when the plane lands where the pressure altitude is 1,920 feet, the altimeter will read zero elevation. If a pilot wishes to determine the altimeter's pressure altitude, he reads the indication of the instrument's reference markers and adds the reading to the indication of its pointers. Thus 1,920 feet plus 5,060 feet adds up to 6,980 feet—the altimeter's pressure altitude.

We can assume that this pilot has flown into a "low" and that his current altimeter setting is 29.65. With the proper altimeter setting, however, it makes no difference whether he has flown into a high or a low because the altimeter setting corrects for non-standard sea level pressure conditions. If flight level temperature is —50°, the pilot calculates true altitude by adding indicated altitude of 7,837 feet to pressure altitude variation of 250 feet for a total of 8,087 feet. That is his pressure altitude and his true altitude is 6,450 feet, according to the sliderule.

Assume you don't know the window's value but wish to guess at it from the position of the reference markers (the small triangular hands near rim of dial). Assume, too, that you have made a proper altimeter setting. Your indicated altitude is 8,675 feet. Pressure altitude is 8,675 feet minus the 520-foot counter-clockwise travel of the reference markers—or 8,155 feet. Now your indicated altitude tells you how far down it is to sea level, plus or minus temperature and scale error. Your pressure altitude therefore will tell you how many feet it is down to 29.92.

Let us suppose that you are flying along above the overcast and want to know your true altitude. If the window value is the proper setting for your altimeter, then the indicated altitude of your airplane is 8,320 feet. However, that is still a long way from the answer you need. From this figure subtract the pressure altitude variation of 357 feet. The result will give you a pressure altitude of 7,943 feet. If the outside air temperature is plus 30° centigrade, you can calculate on your computer that the true altitude of your airplane is approximately 9,220 feet.

The same method of instruction apparently has been used in training our pilots, but with less success. The writer tested hundreds of Army pilots and learned that approximately 15 per cent could neither tell the correct time nor read an indication on a three-pointered sensitive-type Kollsman altimeter. The tests were made on the ground and not under actual flight conditions. Possibly the stress of flight may diminish this percentage. Most pilots are basically non-familiar with altitude measurement despite its great importance in the art of flying.

It is not much of a trick. The problem of altitude measurement involves the application of certain corrections under certain conditions. Although more detailed and exact methods will be used by weather observers, bombardiers and navigators, the pilot himself need only:

1. Get the latest altimeter setting.
2. Note the indicated altitude (*Continued on page 72*)

This pilot plans to land at an airport with a current pressure altitude of 2,973 feet. He has made the proper setting with the reference marker so that the altimeter will read zero on landing. The pressure altitude of an airport may vary hundreds of feet from the surveyed altitude of the field. No matter what the variation, however, if the pilot makes his setting carefully, the altimeter should read zero upon landing. The indicated altitude above the runway is 7,170 feet. Pressure altitude of altimeter is the sum of 7,170 and 2,973 or 10,143 feet.

The pilot has just received the broadcast altimeter setting of 30.03 and has adjusted the window for that reading. The pointers therefore show his indicated altitude to be 8,165 feet. How can he find his true altitude? From the indicated altitude reading of 8,165 feet he subtracts the pressure altitude variation of 100 feet. This gives him a pressure altitude finding of 8,065 feet. If the scale error is zero and the outside air temperature is —30° centigrade, the pilot can readily calculate on his computer that his true altitude is approximately 7,850 feet.

STINSON'S 1948 VOYAGER

Seaplane version gets best performance with variable-pitch propeller, needs no extra fin. But the set of floats costs $2,795 extra.

BACK IN OUR MAY, 1946, issue, I said the Stinson *Voyager* was "one of the best airplanes in its class to be had today." That was my opinion after having spent quite some time flying one of the first 150-h.p. *Voyagers*. Since that time, the *Voyager* has established itself as the most widely-used four-place personal plane in the world.

Though a number of 150-h.p. *Voyagers* were sold, the greatest number of these airplanes around the country have 165-h.p. engines—the same basic airplane, with 15 more horsepower on its chest. Now comes the 1948 model, which is the 1947 *Voyager* with a new all-metal tail and a few minor refinements.

The new tail is the most noticeable change, both from the standpoint of appearance and flying characteristics. With the old tail you could boot the rudder around carelessly without causing any appreciable gyrations on the part of the airplane. But it's a different matter now. After several take-offs and landings I still found I was overcontrolling with the rudder. It's most noticeable on takeoff. When you instinctively push hard right to counteract torque, you suddenly find yourself going hard right off the runway. And you hadn't better ride the rudder during a landing, either. Between the steerable tail wheel and the sensitive new rudder, you can easily go veering off to one side or the other.

Once you get used to that new feature, however, the 1948 *Voyager* is just as delightful an "old man's" airplane as its predecessors. There isn't a mean characteristic in it, no matter how you mishandle it. Even the fact that the 1948 model is a bit heavier for the same horsepower, and lands four miles an hour faster, doesn't alter that fact.

I flew a 1948 *Voyager* (NC-732C) from the Stinson factory at Wayne, Mich., to Chicago. The total distance worked out to 312 miles, and my flying time was 02:12. That works out to a cruising (*Continued on page* 89)

All-metal tail includes big fin, new rudder and new rudder tab. Ship is eight inches longer.

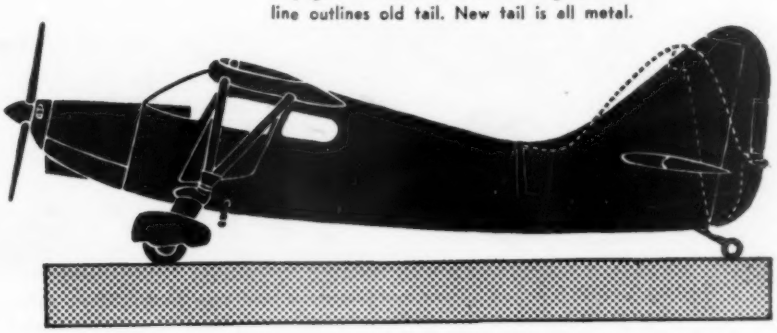
Station Wagon version of new Voyager has useful load of 1,106 pounds. Its range is 554 miles, a 22 per cent increase.

FLYING's CHECK PILOT

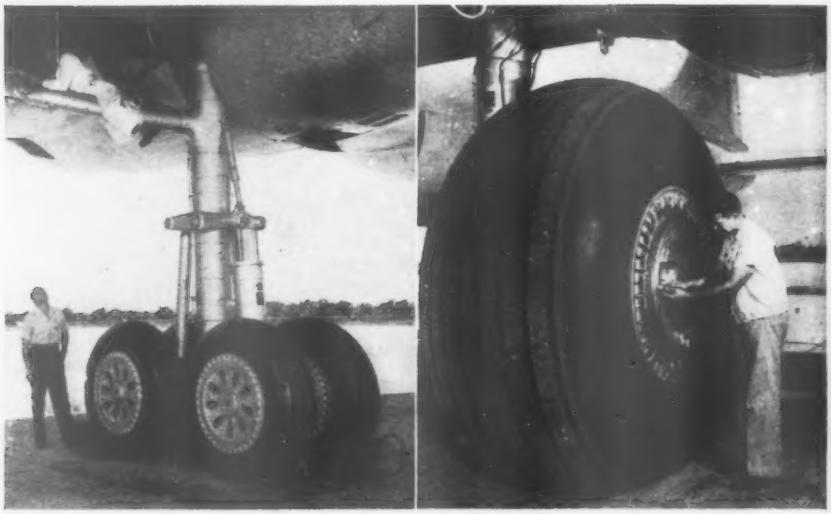
EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Only aircraft holding a CAA Approved Type Certificate are flown. The author is not a professional test pilot. He evaluates each aircraft through the eyes of an average private pilot who flies an airplane either for business or sport.

Difference in tails between 1947 and 1948 Voyagers is shown in this drawing. Dotted line outlines old tail. New tail is all metal.



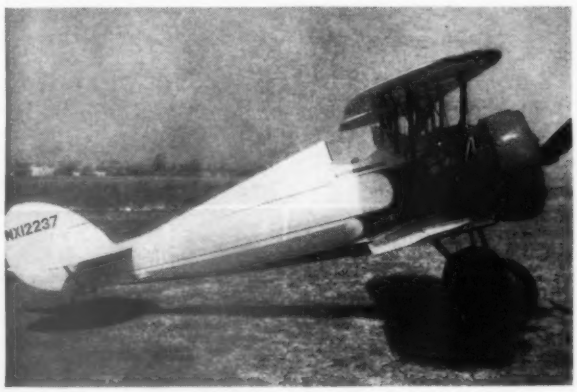
HAVE YOU SEEN?



Old and new tires for giant B-36 bomber are shown above. Older gear utilized a single 110-inch tire. Newer four-wheeled gear is lighter, safer in case of blow-outs, and distributes the 278,000-pound weight of the plane better. Dual wheels of nose landing gear remain the same. The B-36 is now in production at Convair's Fort Worth factory.

Dusting 'Copter is Bell agricultural model used last September to dust Buffalo city garbage and refuse dumps with DDT powder. The program was part of an experimental campaign against house flies which officials believe may help spread infantile paralysis.

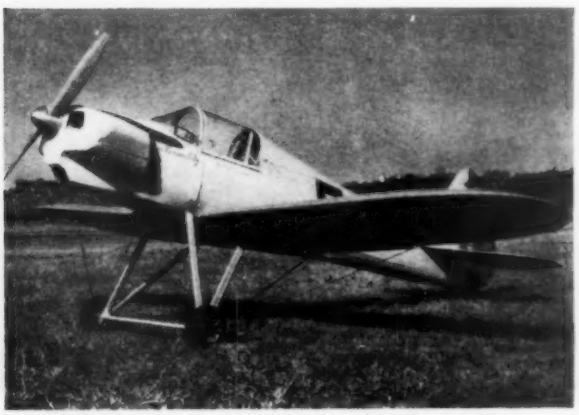
Flight Line Restaurant at Santa Barbara Municipal Airport, Santa Barbara, Calif., gives unique cafe service to visiting pilots. Christine ("Crissie") Le Vay is laying a cup of hot coffee on the line to Clarence Young, on wing of a Beech Bonanza.



Garland Lincoln LF-1 with Wright J-4B engine was built from plans of World War I Nieuport. Plane cruises at 158 m.p.h.

Packaged plane is Boeing XL-15, new Ground Force liaison craft which can be hauled in truck. Reassembly takes an hour.

Retired Fortress attracts business to filling station owned by ex-Pilot Art Lacey on Highway 99E, near Milwaukie, Ore.



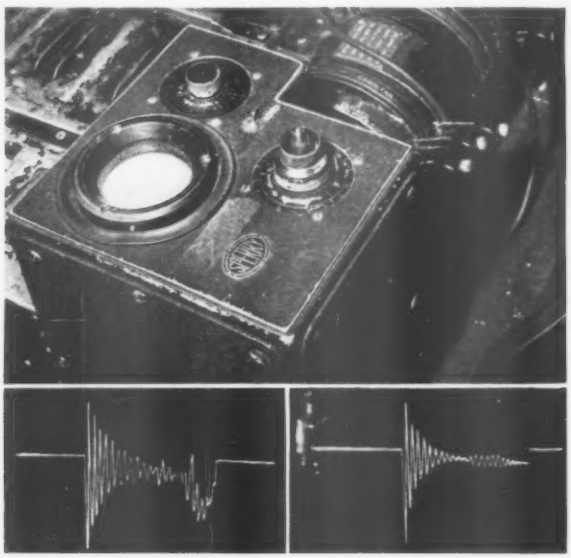
Eighteen-year-old racer, Baker Special, is former Benny Howard prize-winner "Pete," which has had extensive changes.

HAVE YOU SEEN?

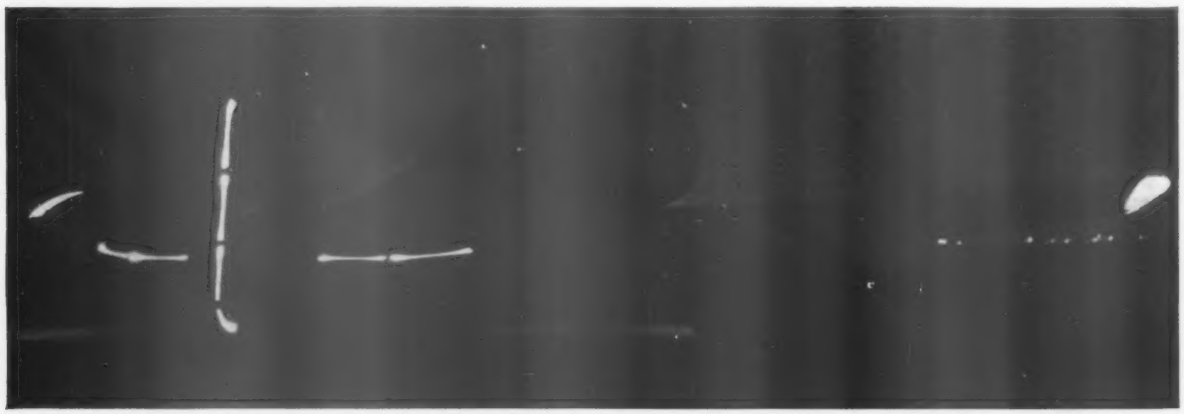
continued

Self-propelled seaplane slip has been developed by the Navy Bureau of Yards and Docks. Built of pontoons, berth moves out from shore along a 600-foot submerged cable and can be swung in any direction—thus simplifying job of maneuvering flying boats.

Mass rescue possibilities of helicopter are demonstrated by Piasecki HRP-1, which has been accepted by the Navy. Five men climb rope ladder simultaneously while 'copter hovers aloft.

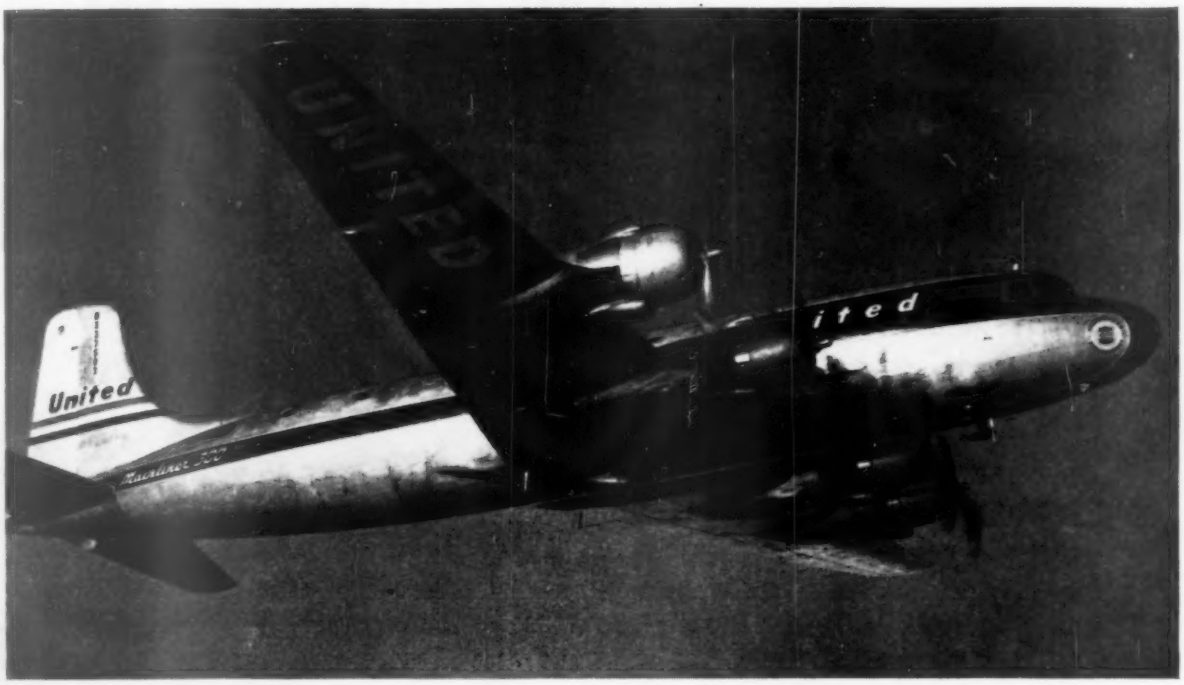


Sperry Engine Analyzer installed in Pan American Constellation sniffs out engine trouble. Photos of cathode ray scope (below) show normal pattern (left) and fouled plug (right).



Luminous SNJ is Navy experimental plane being tested by the Aero Medical Laboratory to find best kind of exterior lighting for night-flying aircraft. This version has Lucite installed on wing tips, rudder and elevators. Flashing lights are also being studied.

REPORT FROM WASHINGTON



The Douglas DC-6 was grounded by U. S. airlines recently pending investigation of fire hazards.

By FRED HAMLIN

STALEMATE is still the watchword on developing new, safer and more useful lightplanes in a big way. Or at least that's the way we heard it via one of our favorite pipelines, reporting from a recent (and typical) meeting of the Civil Aeronautics Administration's Non-Scheduled Flying Advisory Committee. Everybody except those representing lightplane aircraft manufacturers favored Federal funds for CAA to do development work. The manufacturers take the stand that NACA should do this type of thing.

The opposition counters with the point that NACA is dedicated to pure research—not development. Manufacturers counter, in turn, with a lot of words about Government not muscling in on private enterprise. One also remarked: "We must be very careful that in helping the industry we do not kill it. The industry is in a weakened condition." How all this will lead to rapid development of new devices and planes in the lightplane field might be called aviation's No. 1 current mystery.

Crash Cockpits

Another thing that the Advisory Committee gave a lot of time to was how to design cockpits so they will not be so dangerous in case of crash. Fred Weick, designer of the *Ercoupe*, offered some of the best ideas. The instrument panel, he believes, should be so far forward that a pilot will not seriously injure his head in a crash. He also suggested building a snubber on the wheel that would cushion the pilot's forward motion in a crash. The wheel, he proposed, might be padded and shaped concave to fit the body.

Kickoff for the discussion was a proposal that new regulations be written to make safe shoulder harness a must [see page 33.—Ed.] Industry opposed this. CAA Administrator T. P. Wright ended the discussion with a crack: "You (manufacturers) have me completely stymied. You won't support me when I ask for money to do development, and you won't accept any further regulations."

Another good crack, by civilian member George Haddaway of Texas: "Noise is closing airports faster than the Federal airport program can build them."

Fire Hazards

As this goes to press, no official report has been made on the cause of the United Air Lines DC-6 crash in the Bryce Canyon area, U., which took 52 lives. The Civil Aeronautics Board, aided by airline experts and Douglas officials, is still busy with an intensive investigation and the chances are that final returns will not be released until mid-January. But it is pretty well conceded that fire caused the crash. And it is on the record that CAB, without naming any names, made a new regulation November 1 ordering landing flare equipment removed from DC-6s.

"Preliminary investigation of (*Continued on page* 81)

I Learned About Flying From That! NO. 98

Never fly an airplane if it doesn't meet your mechanical standards, warns this pilot.

By
GEORGE W. MORSE
former RAF and Air Transport Command pilot

Pilot Morse, now a civilian flyer, ran into trouble on a routine Army ferry flight from Coolidge, Ariz., to Salt Lake City in a Thunderbolt.

"P-47," the orders read. "Coolidge, Ariz., to Salt Lake City. Routine ferrying."

I walked out into the hot light of the air base ramp and thought: "Perfect. A long-awaited change from four engines. Friends in Salt Lake City and a *Thunderbolt,* shining new. What more could I ask?"

It wasn't until I saw the plane that the picture changed—fast. And right there I made the first of two unforgivable mistakes, both of which came within aces of costing my life. I knew the rule: "Be sure of the mechanical condition of your airplane. You're not flying a plane you don't trust; it's flying you." And I knew that getting stubborn about an airplane is a trait a pilot, to maintain a whole hide, must lick . . .

My "shining new" *Thunderbolt* turned out to be a war-weary relic squatting at the end of the line. It was battered and grease-stained, and paint was peeling from its olive-drab wings. Nicks and scars ran the length of the fuselage; Form 1 listed a dozen mechanical troubles, hastily marked "Repaired." I groaned.

The engineering officer looked anxious. "It's going to Salt Lake to be scrapped," he admitted, "but we've been all over her. She's okay."

The word "No!" was on the tip of my tongue. I had every right to turn down the plane, but instead I thought of the friends in Salt Lake. I thought of the red tape involved in getting my orders changed and the prospect of another long four-engine delivery. First of my two big mistakes came when I heard myself saying, "I'll take it."

Of course, I checked the craft carefully on the runup. I even circled the field a couple of times before heading out over the rugged, mountainous route to Salt Lake. The big Pratt & Whitney seemed to run smoothly enough; I disregarded the instruments that were out and the chattering vibration that came with the ship's age. I climbed to 12,000 feet and headed north.

It was clear up there, crisp and blue. For an hour I was wary, even as the check points slid uneventfully below. Then I thought: It's doing all right, isn't it? Friends in Salt Lake. No lumbering four engines. Relax.

I relaxed until my windshield suddenly turned black, jet black. Oil. First a fine mist, then great splashes. I grabbed the map, searching desperately. I had planned a gas stop at Las Vegas, and (*Continued on page* 93)

2 FOR THE 2-0-2

Two great Goodyear teams — wheels and brakes, tires and tubes — are on the new 2-0-2, Martin's high-speed luxury passenger plane. The majority of aircraft manufacturers and airline operators specify Goodyear landing gear equipment to assure the utmost safety and dependability during take-off and landing runs. Here's why you get maximum safety when you specify Goodyear: light, super-strength magnesium alloy wheels—time-proven, self-adjusting Single Disc Brakes —extra-rugged, longer-lasting tires and tubes. To secure complete information about Goodyear aviation products, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

GOODYEAR
AVIATION
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MORE AIRCRAFT LAND ON GOODYEAR TIRES THAN ON ANY OTHER KIND

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun." Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING, news-letters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

MUCH DEBATED Air Traffic Rules (Part 60), were argued before the Civil Aeronautics Board again last month at a hearing requested by the Air Transport Association.

J. B. Hartranft, Jr., general manager of AOPA and representative of private pilots, presented a 24-page statement in which he said airline interests had evidenced a hostile attitude toward private flying and had submitted data designed to discredit the integrity and flying ability of private pilots.

"Much of their argument favoring passage of the four Part 60 amendments is based on this derogatory testimony," he said, "and it seems fair that it should be examined carefully."

Mr. Hartranft also stated, "In the industry panel meetings concerning proposals to revise CAR, Part 60, non-scheduled organizations deliberated for hours in a sincere effort to meet the harsh demands of airline interests. Concessions made by our group were many. In return we received scant compromise from the airline groups but it was agreed to freeze Part 60, with the exception of four points, until it had been thoroughly tried."

Four points referred to by Mr. Hartranft, were:

(1) Proposed regulation requiring 1,000-foot ceiling and three-mile visibility for contact flight within an airport control zone; (2) right side airway separation requiring aircraft flying within an airway to stay on the right-hand side of the airway; (3) proposed regulation requiring all airplanes to cross airways at a 45° angle; (4) proposed hours-of-darkness regulation amendment which would shorten the flying day one hour for aircraft which are not equipped for flight at night.

Concerning the ceiling and visibility regulation, he mentioned climatic variations and terrain differences found in the U. S. which make such a regulation arbitrary and unenforceable.

"Proponents of this regulation have tried to minimize its application by pointing out that it applies only within three-mile airport traffic control zones served by radio," he said. "This is totally inaccurate, since the trend is toward large, irregular control areas in lieu of uniformly small three-mile areas originally contemplated."

Mr. Hartranft cited Washington, D. C., as an example of such over-grown control zones. Instead of the three-mile traffic control zone, Washington has an extended five-mile control zone, and in addition has a tail stretching 26½ miles along the airport instrument runway direction, the AOPA General Manager stated in his appearance before the Board.

Right-hand traffic on airways was discounted by Hartranft, who pointed out that there is no way the average private pilot can determine when he is or is not flying *within* the civil airway, unless he has landmarks or other physical means of knowing definitely when he enters the zone.

"Airways crossing at a 45° angle was tried once before and found not to work for the reasons stated above—a pilot has no means of knowing when he has crossed into an airway."

Regarding the proposed hours-of-darkness regulation change, basis of Mr. Hartranft's argument was the cost to modify lightplanes for night flying. Since the CAA will not allow the use of "hotshot" batteries, a plane carrying lights must have an expensive wet storage battery and a generator, either wind-blown or engine driven. Wind-blown generators have not proved satisfactory, and it would cost aircraft owners $18,025,000, or an average of $300 per plane to mount generators in the 67,101 U. S. lightplane engines. Cost of light fixtures, wire, storage batteries and labor is not included in the above figure, according to Mr. Hartranft.

"We would not argue any regulation on the basis of compromising with safety merely for an economic requirement," he concluded. "However, in fairness one must appreciate that the problem is theoretical since there are no accident figures to indicate the need for these changes. We reiterate our belief that if current regulations are known and reasonably enforced, they will be entirely adequate." END

AN EDITORIAL

OPEN LETTER TO PILOTS . . .

WE REGRET to advise that effective March 1 your flying activities will be cut 40 per cent!

What would you say to such an ultimatum? You'd fight it, band with your fellow sufferers and demand fast action, wouldn't you?

Of course, things do not happen in exactly that manner. Never that *obviously*. A Government bureaucrat or selfish commercial interest would be just as reluctant to reveal in advance his plans for Government controls as a thief would be to tell the police of his burglary plans.

We can face and solve situations which are heralded by dramatic edicts. But personal flying has not been given any such ultimatum.

What's the fuss, then?

Just this—Curtailment of personal flying *is* threatened; the 40 per cent figure is very real. But the situation isn't obvious to many pilots. It's not "sudden death," but more like *creeping paralysis*—a well planned campaign *gradually* to squeeze personal flyers off the airways and slap them on the ground (except when a midday sun shines from cloudless skies).

What do I mean? Here are four frightening examples of proposed regulations sponsored by airlines and other groups which would, if passed, drastically reduce the utility of personal aircraft and curtail your flying activities.

One concerns mandatory filing of flight plans. Another—increase of visibility requirements from three to five miles. CAA's medics are again proposing more strict medical requirements. Airline interests are pushing to eliminate the private pilot's right to fly contact over-the-top.

Who is going to stop this? Are you? How?

Private aviation must fight *today* for its rights—tomorrow will be too late. The opposition is strong, moneyed and influential.

But the little fellow—private pilots—must and *can* lick this giant *IF* we organize and work under one strong banner.

Making no bones about it, this is an appeal for members. I need the support of *every qualified non-scheduled pilot in the United States.*

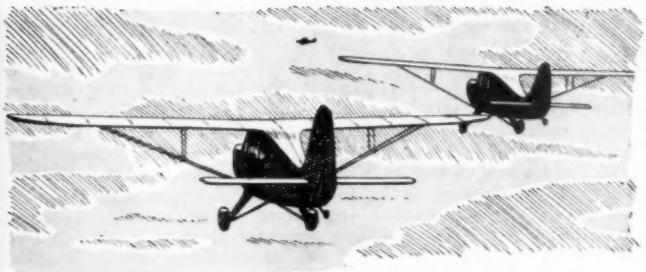
Pilots who believe in fighting for their right to fly are urged to write AOPA Headquarters. Give us your name, address, pilot license number and your written permission to represent your interests in Washington and elsewhere. If you cannot afford AOPA's nominal membership dues ($5), at least *lend your support.* Authorize us to cast *your* vote to kill the 40 per cent threat and "KEEP 'EM ALL FLYING."

Fraternally,

J. S. Hartranft, Jr.

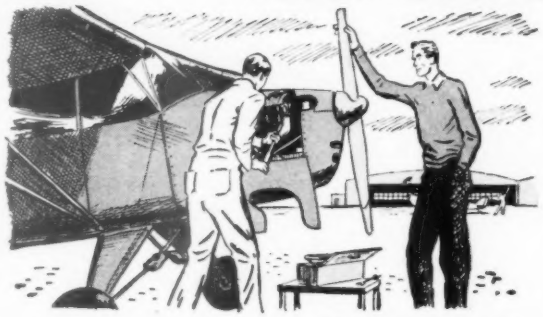
J. B. Hartranft, Jr.
General Manager, AOPA

Standard of California's PLANE FAX



A page of service tips for private flyers and fixed-base operators

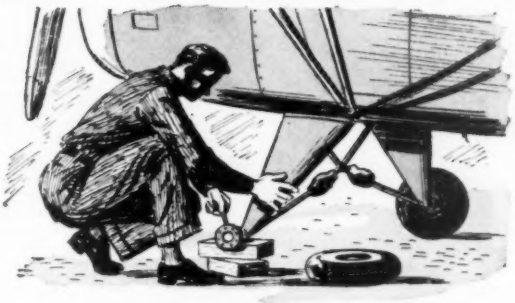
Fixed-Base operators must watch costs



Accurate accounting, financial integrity and low maintenance costs are three essentials of sound fixed-base operations. That's why many operators depend on RPM Aviation Oil to increase time between engine overhauls. For example the detergent in "RPM" cuts down engine upkeep costs by keeping pistons, ring grooves and crankcases cleaner and rings free.

Use only specified lubricants for each plane part

To prevent failure of vital parts, you need lubricants specially designed for flying conditions. That's why you're safe with "RPM" flight-tailored lubricants. Every one—from fine instrument oil to rugged wheel bearing lubricant—designed for aviation. And to make sure the right lubricant gets on the right spot, all Standard Airport Dealers follow Standard of California factory-approved charts covering every lubrication point on your plane.



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Fly-It-Yourself

(*Continued from page 23*)

Pittsburgh, Cincinnati, Albuquerque, Minneapolis and scores of cities and towns within a 300 air mile radius of Kansas City.

One of his best customers is Rufus Wilson of the Wilson Electric Company, Kansas City, who has flown Saunders planes three times every week in the 16 months Bill has been in business. All of Wilson's trips were on business, and all were within a 100 mile radius of Kansas City.

Wilson's repeated use of Saunders planes is typical; 94 per cent of all Fly-It-Yourself patrons are repeat customers. And of the rental volume, 81 per cent has been for cross-country flights rather than local, and slightly more than two-thirds of the cross-country flights have been for business rather than pleasure.

"Like the Flying Farmers," says Bill, "my customers are discovering that they have a definite need for an airplane. The fact that 94 per cent of businessmen-clients are repeat customers proves that.

"But unlike the flying farmer," he continues, "city dwellers don't have convenient home-landing spots and hangar facilities. And that is where I step in—taking care of the initial investment, depreciation, insurance, maintenance and gas and oil—all for an hourly, daily or weekly charge."

Based on the expenses of a $3,500 plane flown annually 200 hours, Bill figures the cost of owning a plane in Kansas City at $10.33 per hour. Fly-It-Yourself's basic charge is only $7.50 per hour, with a minimum charge for four hours' flying each day the plane is out. But rates are often modified, depending on the kind of business, nature of trip, total time away from the airport—and with special consideration shown commercial accounts.

"Too many airport operators," he says, "try to collect every nickel per hour's flying time from the customer. I have found it better to charge reasonably and fairly, depending on the circumstances. Most of my customers are well satisfied."

And Fly-It-Yourself customers do have one thing in common: at little expense and no investment, they all have had an opportunity to see how useful planes actually are. Some join the ranks of regular airplane owners. When this happens, Bill loses a customer. But he is philosophical, believing that their use of new planes will be an incentive to their friends to try out his rent-a-plane service.

Each new Fly-It-Yourself customer is checked-out on the airplane he is to fly, After signing a contract and paying the estimated rental fee plus 25 per cent to take care of any additional use. The contract governs the use of the airplane, fixes the liability of the customer in case he damages the aircraft, and places a moral responsibility upon the renter to treat the airplane as he would his own.

"At first many of our customers hesitate to sign such an agreement," Bill admits, "but when we tell them of complications that arise in case of accidents, most customers welcome a definite, black and white agreement that indicates exactly where they stand."

The customer agrees: (1) to pay the first $50 of any damage to the plane, (2) not to vary from the agreed flight itinerary, (3) to land only at approved airports unless others are agreed upon in advance, (4) to abide by all laws regulating flight, (5) to pay for damaged or missing accessories, (6) not to allow other persons to fly the plane, and (7) not to resume flight after repair work without permission.

Saunders attributes his low accident rate to this contract and to precautions exercised in checking the renter carefully. Only three Fly-It-Yourself planes have been damaged in the past 16 months, and total damage to all three airplanes amounted to less than $2,000. None of the crashes resulted in personal injury, and only one in a property damage claim —$30 for a fence broken by a horse frightened when a plane made an emergency landing in a pasture. On that forced landing, the plane was damaged when it hit a ditch. Other losses were sustained when an *Ercoupe* was stalled 30 feet off the ground during a landing, and when the wings of another *Ercoupe* hit a fence at the end of a field.

Bill carries full ground coverage, a five per cent deductible flight coverage, and a $30,000 single limit policy that protects Saunders and his customer against legal liability for damage to property of others and for bodily injury to persons in the plane or on the ground.

Because he is operating in an entirely new field, Bill's rental volume alone is not yet sufficient to maintain a going concern, so to augment income he has three instructors who fly mostly GI Bill of Rights students. But his rental volume is 63 per cent of the total, and Bill thinks this figure will increase as student training drops off and more qualified pilots become acquainted with Fly-It-Yourself facilities. His sister, Mary Clay Saunders serves as his secretary. Because of space shortage, maintenance is handled under contract.

One of the most regular Saunders customers is Ted Brown, president of Associated Bearings, Inc., of Kansas City. With customers scattered over a radius of 300 miles in several states, Brown says he and his pilot, R. C. Corbin, secretary-treasurer of the company, can leave in

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the morning, see their customers and return to Kansas City on the evening of the same day.

"It's good salesmanship to use a plane," declares Brown. "We call ahead, ask the customer to meet us at the airport, and by the time we arrive every one in his plant knows the name of our company and the purpose of our trip."

Another good Fly-It-Yourself customer is E. M. Greb, partner in the Greb X-Ray Company of Kansas City, a distributor and service organization which contacts doctors and hospitals over a four state area.

"We use the Saunders system at least six times a month for a total of 25 to 30 hours," says Greb. "Other means of transportation would mean x-ray equipment idle for days; and in these days of frequent automobile accidents, that may mean life or death.

"Or, we sometimes have a prospect for equipment 200 or 300 miles away. With a Saunders plane it's no trick at all to fly him to the equipment, demonstrate it, and make the sale."

First Saunders Fly-It-Yourself began in 1929 at Fairfax Airport in Kansas City, Kan., but was a failure. From left, members of the Saunders family are Harris, Joe, Warwick Jr., Ellis and Warwick Sr. Three Arrow Sports in rear.

Another Fly-It-Yourself customer is M. R. Pasley, supervisor of the liquid petroleum and gas department of the Consumers' Cooperative Association. He inspects the installation, sales and operations of 31 plants over a nine state area.

"On my last Fly-It-Yourself trip," Pasley says, "I left Kansas City one Sunday, held 10 sales meetings in North Dakota and South Dakota during the week, attended a meeting in Scotts Bluff, Ia., on Saturday, and returned home on Sunday. The same trip by auto would have taken three weeks, and with added hotel and meal expenses would have been considerably more expensive."

What about Fly-It-Yourself's future? Bill believes today's greatest problems are the weather and lack of airport facilities. He hopes something like the castered landing gear and GCA for all private planes will overcome those obstacles.

But both Bill and his customers feel Fly-It-Yourself will really come into its own when you can "Fly It and Leave It." For the distant future he has in mind an organization of airport operators dispatching planes from one town to the other somewhat like boxcars on a railroad. While "Fly It and Leave It" may be a little far-fetched at the present time, Saunders is now trying to work out a mutual agreement between operators—but he admits he is making little progress.

Saunders' present plan provides for uniform rates, and use of an identification card somewhat like the credit card issued by oil companies. This card, he believes, would eliminate much red tape and checking of established customers.

But also important to the Fly-It-Yourself business is the development of a good flight-hour meter that will give a complete 24-hour record of the operation of the plane. Most of the meters today can be disconnected too easily, and do not show the number of r.p.m.'s and the hours of the day.

What Bill Saunders envisages along that line is a disc of cardboard turned by a clock 24 hours a day. On this disc, a needle would write when actuated by an arm attached to the tachometer. The arm could be locked and sealed. He believes it should show the number of r.p.m.'s and the hours of each day. The meter would give an accurate flight-time record.

Once the three steps mentioned above are taken and the airport and weather problems are licked, he foresees nationwide airport operators organizations that will make Fly-It-Yourself the most desirable form of private cross-country travel.

Back in 1915 his father rented a $1,500 Ford touring car for $10 to drivers who could not afford to own an automobile. His father saw that business grow to one owning and renting thousands of automobiles and trucks, and with branch offices in 86 cities of the U. S. So you can hardly blame Bill Saunders if he dreams a little of the future when a huge Fly-It-Yourself System will own thousands of private planes which criss-cross the nation's airlanes daily. END

Desert Watchmen

(*Continued from page 27*)

run into a fence. So wherever possible he skirts the pack and cuts the fence. From his experience he can usually guess the direction the trailing hounds will take.

While the call goes out to Moore and one of the flyers (usually Paul Voorhees, a Tucson charter flyer with a BT-13) goes after him, other pilots are alerted immediately.

During the last alarm when a little girl had wandered off into the desert in blistering noonday heat, a BT-13, a PT-19, an Aeronca, and a Piper *Super-Cruiser* answered the call. The operator at Mission Airpark in the vicinity of Boboquivari Peak where the child was last seen, offered the facilities of his field, and his Aeronca. A nearby ranch furnished saddle horses. Sheriff Martin drove up with seven deputies. The *Super-Cruiser* was piloted by Henry Hudgin, local amateur pilot; Joan Blair flew the PT-19.

While the sheriff, deputies and flyers studied the map, Moore left on horseback in search of the trail. As a rule he finds some trace of it first, then "sets the dogs" on it. Once the dogs are permitted to take over, he lopes behind because, he says, the hounds are usually so sensitive they refuse to trail if they are overruled by a handler.

Only a select few of his hound pack are taken on missing person searches. Bloodhounds are gentle and timid, but in penitentiary work, which includes chasing escaped criminals, Moore had to teach them to be ferocious when they reach their quarry. Only the gentlest female dogs are taken on air trips to look for missing persons, especially children. These hounds have been trained to bay the track, and to continue baying after finding the person. Once it took Moore two hours in rugged terrain to get to the missing person and the dog. The dog never stopped baying—but by the time Moore got to it, it was so hoarse it had laryngitis!

After 1 hr. 30 min. the girl was found by Moore's dogs. She might have been found much later—or never—had not the dogs been flown to the area, to find her track still "hot" enough for rapid trailing. Without dogs she never could have been spotted from a plane; she was barely noticeable, a tiny bundle under a huge saguaro cactus.

On another occasion an old woman who had escaped from the local insane asylum was noticed from the air, and tracked down on the ground with the help of hounds. So successful has been this combination of dog and plane that both volunteer pilots and Moore have received calls for assistance from distant points in the northern part of the state. And presently there is talk about introducing a bill in the Arizona legislature, appropriating funds for this work, instead of throwing the entire financial burden on the shoulders of a few generous individuals. END

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Mountain 'Copter

(Continued from page 35)

was piloted this time by Brady. In 40 minutes I stepped out on the rock-strewn ice of the glacier at 3,800 feet to join Dr. Carter.

Brady offered to take our packs farther up the glacier but a big ridge of ice hid the exact spot where he left them, and the glacier abounded in rocks the same color as the packs. We had no food or equipment and the camp site was 10 miles up the glacier. We spent hours hunting the packs and found them just five minutes before we planned to give up and head for the camp site 10 miles up the glacier. We were compelled to camp out on the glacier when darkness came because we could not find the camp site. Morning revealed that the other climbing party had not waited but gone up 4,000 feet to a higher camp on the big Tellot Glacier which was located in the next valley north.

The rough trip had ruined Neal's boots. He wired his soles to the uppers and we left a message in the snow for George Williamson, who was keeping track of us from a Luscombe. The next morning Williamson dropped another pair of boots. We tracked the other climbers to their bleak camp at nearly 10,000 feet. Guided by three of the dead climbers' companions, Neal and I went to nearly 11,000 feet on Mt. Serra by a route which most non-climbers would find terrifying. But we had come to a clear understanding not to risk our lives or our companions' lives, and we decided it would be impossible to bring out the body.

We dug a grave in the snow at a glacier edge and built a rock cairn at the nearest suitable place. This melancholy task was finished in a driving snowfall, and we made our long descent to Tiedemann Glacier in a storm. There an inch-an-hour snow bore down on our tent in the night.

Before breakfast we stamped out a long message to Williamson in the Luscombe and we heard him more than once but fierce downdrafts around the cloud-capped peaks prevented him from getting down through to read the message until nearly twilight. He was flying with a door off, having dropped supplies to the higher camp. "Damn cold," he scribbled when asking for a check on his reading of our message.

We slept happily that night, knowing the helicopter would meet us down the glacier the next day—weather permitting. That is a very uncertain factor in this area, where 10 days of rain or snow are fairly common.

From his plane Williams reported our progress down the huge glacier and we were genuinely relieved to reach the spot where the 'copter could pick us up. Montgomery thought I was a pessimist when I kept all our food and fuel as he took off with Dr. Carter. But mountain storms come suddenly and I was mighty relieved when the helicopter came back for me —this time with Brady at the controls. Our trip taught us one thing: the helicopter is a serious and practical flying machine. END

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This Is Private Flying

(*Continued from page 28*)

In the first place, nobody can be expected to keep a line boy if he doesn't need one. If the operation is that small, it won't hurt the operator himself to gas visiting planes and wipe their windshields. I know a good many service station owners—and not small ones, either—who do it cheerfully and gladly. I know one man who owns a bulk plant and a dozen gas stations, but he pitches right in with his help when they need him.

There are too many operators who just don't know what good line service is. They ought to find out, and then they ought to provide it. They ought to look beyond the immediate two-bit profit, which they seem to scorn, and consider the dollars that lie ahead if aviation as a whole prospers. They must be made to see that the average private pilot's first, and most frequent, contact with private flying is with their line service.

When I flew into Helena, Mont., municipal airport on this trip I received the best line service of any of the 48 airports where I stopped. I will describe it in detail so you will have my idea what good line service really is.

I just managed to squeeze in at dusk here. Darkness comes on quickly; there isn't much twilight in the mountains. I didn't know the control tower was operative because it wasn't listed on my chart and I hadn't checked the Airman's Guide. I came in on the tail of an Army plane and the tower, not knowing I saw the plane, gave me a red light. I must confess that I didn't even see the light, one reason being, of course, that I wasn't looking for it and was watching the ship ahead of me very closely. Later the towerman called me to inform me that the tower was operative and that he had given me the red light. They knew I was a stranger and because the tower had been operating only a short time and wasn't on any chart they instructed me gently as to the facts and didn't reprimand me.

But what I started to talk about was the line service. I taxied up to the line and was met by three men. The one who opened the door asked me courteously if there was anything he could do for me. I told him that I wanted to park the Luscombe for the night and wanted to get a hotel room. The man said "fine," and directed me to a tiedown spot next to a Cessna. Each of the other two men got on a wing tip and the third signalled me as I taxied to the designated spot. The three had the plane tied down before I got my earphones and safety belt off.

After my engine was shut off, the man in the front carefully turned the prop sidewise so it would be parallel with the ground. This little item takes a negligible amount of time but it is indicative of good service. Wooden propeller manufacturers always recommend it to prevent water from collecting in the lower blade when the plane is stored for any length of time.

As I removed my bags from the plane, the men picked them up and led the way to the airport office. I asked for transportation to town and for a hotel room. I was told that they would call the hotel but that I didn't need a cab because they were going in and would be happy to have me go with them. This was one of only two airports on my entire trip where I got a free ride to town.

The next day I asked for a radio man and I was taken to a mechanic school on the field and their radio man came over and diagnosed my trouble. He didn't have time to fix it himself but left complete instructions with a mechanic at the field. When I came to pay my bill, my radio service, maintenance service and line service were all on the same bill and I didn't have to chase to three different places to pay it, as very often happens.

Another line-service highlight was my landing at Tucson in a high wind and rainstorm. The airport sent a car out with three men to meet me and hang onto my wing tips when I had to turn crosswind. They took me right into the hangar. If they hadn't been there I might have had trouble with the wind. My guides were soaking wet from the rain and the highest compliment I can give them is that they understood the meaning of *service*.

It's unfortunate that the two cases I've cited here involve three men each. Offending operators will undoubtedly pounce on that fact, screaming that, if they could afford to have three men on the line for such service, they too could give special attention to each transient pilot.

Which I'm firmly convinced, is not true. Good service is an attitude. It is an operator's firm belief in sound merchandising—and he can be all by himself, with a tiny two-way strip and one gas pump, and still give service superior to that of most large, well-staffed airports.

Bellflower Airport between Long Beach, Calif., and Los Angeles, also set an example of airport service. I landed on the single strip there and rolled down to the end to turn off onto the taxi strip. There was a big sign which read: "WELCOME TO BELLFLOWER." I taxied up to the office building and was met by a lineman who directed me to a tie-down. Another lineman was out there to tie me down and I went on into the office. I left instructions to service the plane and went on into Los Angeles.

When I came out the next day I paid my gas bill and 50-cent tie-down charge. I went to my plane and found a little tag on the instrument panel informing me that they had filled the tanks, checked the oil, pumped the tires, cleaned the windshield and dusted the plane off.

This was the first time since I left the

AIRSTRIPS FOR ONTARIO

SMALL municipal airports with L-shaped landing strips are contemplated for Ontario highway intersections. Construction blueprints for such airstrips have been drawn by the Ontario Department of Highways planners, and a number of municipalities are already laying out airports according to these plans.

The highway department wants to save small towns the expense of building roads from airports to provincial or county highways. Such landing strips could be maintained by highway department staffs if necessary, and local operators could cater to highway traffic with gasoline, repairs, restaurant facilities and other services.

Proposals of the department call for landing strips 1,000 feet from the highway. The strips would be 500 feet wide and from 2,000 feet to 4,000 feet long, dependent on anticipated traffic. Sodded strips would have paved surfaces at each end, on which wheels of landing aircraft could start rolling without cutting up the sod. Airstrips would be marked and would have directional marking where the two arms of the right-angled strips intersect. If traffic warrants, a third airstrip could be built to complete the triangle.

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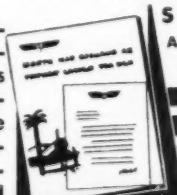

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factory in Dallas that the side windows of the airplane had been cleaned.

As I taxied out for take-off there was a big sign at the end of the runway reading: "CALL AGAIN, BELLFLOWER AIRPORT."

I have gone into this detail to emphasize what I mean by good line service. It is begun by a courteous greeting as you taxi up. The line boy asks what he can do for you and is ready to give you directions. Whether you want tie-down, gasoline or maintenance, you still need those directions at a strange airport. Good line service includes prompt and efficient fueling, an automatic oil and tire check, cleaning your windshield or at least checking it for cleanliness. If you are paying for tie-down, the least you can expect is that your plane will be tied down for you. It also includes the privilege of paying the line boy himself for gasoline and oil without having to traipse all over the airport or into the office hunting for the manager to pay him. If the line service is done by a mechanic, he should give the plane a quick visual check—not only to protect the pilot if something is obviously wrong, but to increase his own business potential.

Now let's look at the more typical kind of treatment I got. At Big Spring, Tex., I taxied up and down the line with the primer open and the engine sounding like a pail of bolts. Finally a line boy came wandering out and stood looking at me until I shut it off. At 11:10 a.m. I asked the boy for gas and for a mechanic. Twenty-five minutes later I had been gassed but still no mech. I finally went into the office and got the manager to call a mechanic, who was in a shop down at the end of the parking strip.

At Sky Harbor Airport at Phoenix, Ariz., traffic was extremely heavy. There must have been at least 150 planes on the field and there were a good many in the air. They were changing runways at the time and there was quite a mixup. I taxied up to the administration building and no one came out so I taxied over to the line and got out and asked for service. When I left the next morning I had to walk across the big field to get my bill.

The same thing happened at a couple of airports in the vicinity of Los Angeles At Santa Ana airport I taxied up to an operator's hangar and opened the primer. No one came out so I wandered around until I found a mechanic, then both of us wandered around until we found the boss who assigned the mechanic to the job. At Grand Central Air Terminal I taxied up and down the line until I found a place to park—quite a feat considering the five-gallon cans filled with concrete (for tie-downs), fire bottles, and so forth that were standing around. Here again I hunted about until I found the boss who in turn found a mech. At Vancouver, Wash., I taxied toward the line and a boy who stood by the gas pump watching me made no motion whatever to guide me. At Bowman, N. D., I landed and found absolutely no one at the airport. Everyone was in town to a parade. However, the manager saw me land and came all the way out from town to gas me up. He knew the meaning of service.

A bit of carelessness at Fresno soaked me with gasoline. The lineman allowed the tank to overflow I was standing downwind from him and the excess gas blew off the wing in a big shower, giving me a gasoline bath. I paid for the gas thus wasted, of course.

I was serviced only once out of cans at Rodeo, N. M., where I paid 26 cents per gallon, one of the lowest prices on my entire trip. Most of the big airports have pits in varying stages of cleanliness. At several places I watched the hose being reeled in with the nozzle trailing along the ground. Even if it was dragged over asphalt the nozzle was bound to be dirty for the next customer—and I suppose it was dirty when it went into my tank as well. Surprisingly, however, I did not get much dirt or water in my gascolator, which I checked visually every day and cleaned every other day.

I saw accessible CO_2 bottles at only 16 line stations along my route. A number of other airports had crash trucks. At Tacoma, Wash., I saw the CO_2 bottle on end with its nozzle in the dirt at the bottom of the gas pit. It would almost certainly have been inaccessible in case of fire.

I hangared the Luscombe at only three or four places along the entire trip, and then usually because the mechanics were working on the plane or I didn't like the looks of the tie-down. My plane was usually tied down by line employees, with my help. The majority of airports did not charge me for tie-downs, but there were a few where I wished they had charged me and provided better facilities. On the other hand I paid $1 for tie-down at Rosemead, in the Los Angeles area, and the ropes were frayed and knotted and there was no tail tie-down. I spent an uneasy night worrying about what would happen if a high wind came up. Fresno had no tie-down ropes and the operator explained that they didn't have high winds there and just chock their planes and let them stand. I hangared my plane.

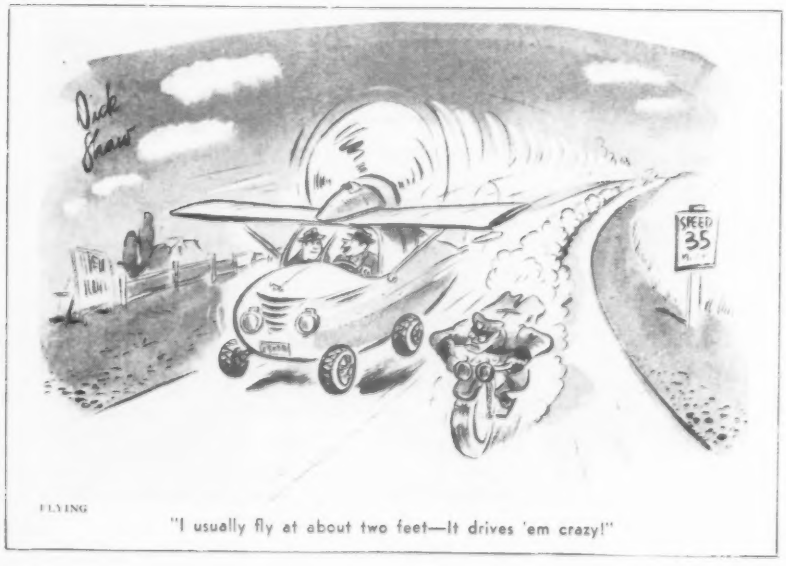
For nine or ten years I have given line service in varying amounts at several airports and I have always made it a practice to give every plane I service a quick visual check to see if anything is obviously wrong. I did not notice a single mechanic doing this to my plane or to any other plane during my entire trip.

I tried to get a complete wash job about a dozen times along the way and I did not get a decent job until my 47th stop—at Rockford, Ill. This matter of keeping my plane clean got to be a kind of touchy subject with me. I deliberately threw several empty cigarette packages and odd pieces of paper around on the floor to see if they would get cleaned up. The inside of my plane was only cleaned out once—at Chico, Calif., where I had an enjoyable stop and was given good service. Otherwise they were still in the airplane when I drew up to my tie-down spot at Hinsdale Airport, near Chicago, my 48th stop.

Line boys and mechanics seem to have strong objections to doing a real cleaning or washing job. When my radio was installed at Dallas before I took off on the trip, the mechanic left greasy fingerprints on top of the instrument panel and left a dark mark on the right cushion. Despite a number of requests to "clean the plane up" these marks are still on the plane three weeks later.

At El Paso I noticed that my control surfaces were badly streaked with oil and dust. The plane had been well oiled at the factory before I took off and in flight the excess oil had blown back over the control surfaces. I asked to have this washed off but it was still on when I took off the next morning, because "the line boys were off yesterday afternoon."

I was in Phoenix, my 11th stop after leaving Dallas, before the line boys at Sky Harbor airport cleaned my windshield for the first time. That was just about average throughout the trip—one out of 10 line stops ended in a cleaned windshield unless I specifically asked for



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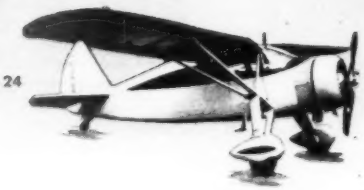
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the service. But even at Sky Harbor they did not clean the oil-marked side-windows.

My attempts to get a good wash job on the airplane were pretty ludicrous. At Fresno I had the plane washed, and even though they used Gunk on the belly it wasn't a good job because they left the water on and it streaked badly. It should have been wiped down, especially as they charged me $5. As I have mentioned, I had a hard time getting my plane cleaned at all, even when I requested it specifically.

I had my 100-hour check at Tacoma and they did not clean the ship despite several requests. The plane was oily underneath, and the elevator, aileron and rudder hinges were full of dirt and oil. I had the Luscombe cleaned again at Miles City, Mont. The man stood about 10 feet away and sprayed the plane with a hose, then let it dry without wiping. It dried up badly streaked, but they only charged me $1.50. When I finally did get the plane washed at Rockford I paid $6 but it was a good job.

There are some pretty untidy practices around these airports. When I had my oil drained at one stop the inside of the cowling was not wiped out and was left very messy. At San Diego I landed at Gibbs Field. The bituminous runways were breaking up and the stands near the shops and hangar area are plain sand that had been sprayed with oil. By the time I got to the line the plane was covered with dust but they gave me exceptionally good line service. While I was talking to the boy, however, a BT-13 taxied up. One mechanic was spraying a fabric-covered plane and another had the engine open. The BT-13 kicked up so much dust it was impossible to see these men working on the plane for a moment. They went right on as though nothing had happened.

At St. Ignace, Mich., I circled the field once just to make sure I knew where to go for gas. There was the single hangar, several planes parked in front, and two or three automobiles nearby. So I landed and taxied over. Not a soul in sight. I stopped the engine and was just about to get out when a man came out of the hangar. Did I want gas? I told him I did. He then pointed out that the gas pit I was parked beside had only 91 octane; the 80 octane I needed turned out to be about a half mile down the field, near a grove of trees.

The man climbed in beside me, I started the engine, and taxied the length of the field to a hole in the ground covered by a sheet of corrugated iron. He filled the tanks, got some tie-down ropes, I started the engine again, and we taxied all the way back to the hangar. Main thing wrong here, of course, was the poorly marked fuel facilities. The operator himself was courteous, considerate, and worked fast. He also took the time to drive me to town and refused to be paid.

Then there was the field at Menominee, Mich. I should say the second field there. Only one is shown on the map—but if you land there you'll find yourself in a farmer's front yard. He came out and pointed out the direction of the new field. So I took off and flew across town. I circled that field, looking for the gas pump. I couldn't spot it, so I landed and taxied to where there were a number of airplanes tied down—and about 50 children running around aimlessly.

I had to stop twice in order to avoid taxiing through groups of children to what looked like a gas pump. When I got there (no one had yet come out of the little line-service hut) one man in a fly-boy cap leaning against the hut just pointed down to the other end of the field. Another half-mile taxi to another hut—to find myself face to face with a Coke machine! I opened the door and yelled to a group of men around the machine. One volunteered the information that the gas was at the first hut. Back I went. I stopped the engine, walked into the hut, and found three men sitting there listening to a baseball game.

One of the three reluctantly came outdoors and gassed the plane. I was following him inside to pay the bill when I looked back and saw about 10 boys climbing over and through the ship. I waited until a passenger I had picked up at St. Ignace returned from an old wooden outhouse, and left him to keep the kids out of the ship.

Inside I asked the service man if he had checked the oil. "No," he seemed surprised, "do you want it checked?" I told him I did, he checked, found I needed a quart of oil, got it, put it in, then had to refigure the bill. When I finally got out of that field, I had lost enough time to cause me to have to land at Kenosha, Wis., because of darkness, although a few of those wasted minutes would have put me into Chicago, my destination. My passenger and I continued by train.

At Kenosha, however, it was an entirely different story. As soon as I landed in the dusk, a man signalled me to a tie-down space after first pointing to the gas pump which he was using to refuel a *Navion*. I simply shook my head and taxied to the parking space. I stopped the engine, cut all the switches—and before I could even get out of the Luscombe another man was tying down my ship. He then helped me unload our six pieces of luggage and put them in a sedan that turned out to belong to the airport manager.

The man then asked if he could help us in any way. I explained that we'd been caught by darkness, and had to continue to Chicago by train. He immediately phoned the city's two railroad stations, found the train that would get us to Chicago the fastest, then told we could either eat at the nice little airport snack bar, or at a restaurant near the railroad station. Then the airport manager himself came in, introduced himself, and said he would drive us into town. He refused to take any payment. Next day I went back up to Kenosha to get the plane—and he refused to charge us for the tie-down, even though I insisted. I asked him how his business was. "Fine," he said, "best it's ever been in the history of the field. We got a lot of transient business. Pilots go out of their way to come back here because they know we'll treat them right."

I won't be around these airports again for a long while, probably, and those that gave me first rate service won't profit directly from my patronage. I am sure, nevertheless, that operators giving fine service will gain business directly from that fact in the long run. But it seems to me that the indirect effects of service quality are vastly more important.

Aviation as an industry is profoundly affected by the sum total of service across the country. For the individual decisions to make this or that trip, or to buy a plane or not to buy one, are decisively affected by the sum total of service by airport operators. END

15 YEARS AGO

FROM the January, 1933, issue of this magazine:

"Who Really Sank the *Mt. Shasta*" was the second article by Gen. "Billy" Mitchell charging that the Navy was prejudiced against the use of aircraft and that it attempted to give an incorrect impression of the bombing trials to the public.

A new inter-stellar rocket devised by Maurice Poirer, Glendale, Calif., was to be propelled by gas made from a German wood. He claimed that these experiments were preliminary to the construction of a rocket airplane that would be able to cross the American continent in five and one-half hours.

A new French torpedo bomber was so designed that its landing gear could be quickly exchanged for pontoons. When used as a torpedo plane, it carried a torpedo weighing 1,430 pounds which was released from 50 to 70 feet above the water.

The *Audax* was a British military two-seater with a device hanging below the landing gear which could pick up messages without landing.

In Germany a peculiar lightplane was designed—a tractor-type monoplane with a short fuselage hung well below the wing while the tail assembly was carried at the rear by a single tubular boom. It was powered by a 23-h.p. water-cooled engine in the nose which drove the propeller through gears by a vertical shaft.

Boeing was designing a new type passenger transport in response to the demand for higher speeds in planes. It was an all-metal, low-wing monoplane with two *Wasp* engines. Designed to carry 10 passengers, two pilots and 400 pounds of mail, the new plane was expected to attain a top speed of 175 m.p.h.

Pitcairn completed the largest cabin autogiro ever constructed in this country. It was a four-place job provided with a 400-h.p. engine and had twin rudders and vertical fins.

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You and Your Altimeter

(*Continued from page 49*)

(For closer accuracy he may consult the scale error card and "calibrate" his indicated altitude.)

3. Get the pressure altitude by setting 29.92 in the altimeter setting window.

4. Apply flight level temperature opposite pressure altitude in the computer window.

5. Locate indicated or "calibrated" indicated altitude on the "B" (sometimes called "minutes") scale and his "true" altitude on the "A" (outer or "miles") scale.

This is the basic procedure of altitude measurement. If the pilot adheres to this procedure he will rarely go wrong. It applies no matter what make of altimeter or computer he works with.

However, if the pilot fulfills these bare minimums in a purely mechanical manner, without understanding his problem or the terms, definitions and procedures behind his solution, he is placing himself on the level of the Moro native. Like a watch, the altimeter is a sensitive, complicated instrument. Its indications are subject to corrections. It is safer to correct consciously than mechanically.

Bearing in mind that the altimeter is a pressure-measuring instrument which could just as easily be calibrated as a simple barometer, let us examine the standard air column in which the altimeter is designed to perform with ideal accuracy.

The standard air column is a column of dry air extending from below sea level to well above the tropopause. The air column is described in terms of pressure, temperature and, in a secondary sense, density.

We all know that any body of dry air will have a pressure and a temperature. If we know the pressure and temperature of a parcel of air we can then calculate its density. For practical purposes, the pilot need not immediately concern himself with density. His principal problems are pressure and temperature.

When we speak of pressure in describing a part of the atmosphere we could just as easily use the term "weight." If we assume that a standard air column possesses a cross-sectional area of one square inch and that we have enclosed it in a leak-proof container extending to the top of the atmosphere, we can now develop some interesting and simple facts. By definition the air column would have a pressure at sea level of 29.92 inches of mercury.

The measurement of pressure in inches of mercury dates back to the celebrated experiment of Torricelli. He reasoned that if you can feel the breath of the wind, the wind has weight. He knew nothing about our atmosphere but he did find that if you filled a tube with water and inverted the tube into a vessel of water the height of the column of water in the tube was approximately thirty-two feet.

Later he used a much simpler fluid—mercury. Nowadays it is quite common in elementary physics to select a glass tube with an internal cross-sectional area of one square inch and a meter or so in length, fill it with mercury, invert the tube in a dish containing mercury, and measure the height of the mercurial column. Above the top of the column there will always be a vacuum. Therefore the length of the column is assumed to vary whenever the pressure varies. The greater the atmospheric pressure supporting the column the longer the column will be. Under standard sea level conditions this length will be 29.92 inches.

Loosely, we say: The pressure today is 29.92. We merely describe the length of the mercurial column. The next step is to compute the weight of the atmospheric column over a square inch of surface. Obviously the weight of the atmosphere will equal the weight of the mercury supported by the atmosphere. We have 29.92 cubic inches of mercury in the tube. By any means available we ultimately describe the weight of the atmosphere, for the mercury in the column weighs 14.7 pounds. Therefore the atmosphere weighs 14.7 pounds per square inch or we say it exerts a force of 14.7 psi.

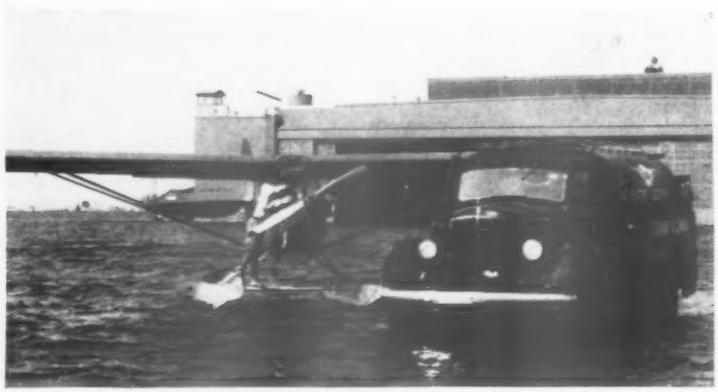
Pressure, then, is the *amount* of air over a given area, conventionally one square inch. Therefore, we can state that whenever pressure is equal at two or more points of observation then invariably there will be equal amounts of air over given areas at these points. If the "pressure" is 29.92 at San Francisco and 29.92 at New York then the weight of our one square inch column of air will be 14.7 pounds at each place.

The pressure at 10,000 feet in the standard air column is 20.58 inches of mercury. This means that there will be a definite weight of air above this point. (Unless otherwise noted the reader will remember that we are dealing with a particular standard air column; it must have a cross-sectional area of one square inch.) We can calculate the weight of the air above 10,000 feet in a standard air column by simple proportion:

$$\frac{14.7}{29.92} = \frac{x}{20.58}; x = \frac{14.7 \times 20.58}{29.92} = 10.11 \text{ pounds}$$

All the air above the 10,000 foot level in the standard air column will have a weight of 10.11 pounds. This method will convert any "pressure" in inches of mercury to a pressure or weight in pounds per square inch.

A sensitive altimeter is constructed in such a manner that whenever a certain pressure surrounds the instrument it will give a related indication in feet. If we rotate the setting knob to 29.92 and subject the instrument to a pressure of 20.58 inches of mercury it will invariably indicate 10,000 feet assuming (as we shall



FLOATS TO THE RESCUE

TWO *Cub* seaplanes recently came to the rescue of the Embry-Riddle School of Aviation on the flooded Opa-Locka airport, near Miami. They did so well at evacuating personnel, supplies and records from Opa-Locka to Chapman Field, 25 miles south, that they were dubbed "Opa-Locka-Chapman Airline."

Reason for the emergency was the floods that engulfed Miami following the last hurricane to hit that area.

Thirty hours were logged on the planes which carried capacity loads from the treacherous sea surrounding Opa-Locka. On occasion high winds whipped the waters so that pilots had difficulty judging the depth, and the floats grated on the concrete or slithered through the grass. Cross-wind landings and take-offs were necessarily frequent, but the *Cubs* were able to move enough supplies to keep Embry-Riddle's G.I. and private training programs operating at a substitute airport.

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do) that there is no mechanical or scale error.

If we placed an altimeter in the standard air column at sea level where the pressure and temperature are 29.92 inches of mercury and plus 15° centigrade the instrument would indicate zero. Leaving the setting at 29.92 we could ascend in the standard air column to any practical altitude and the instrument would continue to indicate accurately throughout the descent.

If we carried it up to 10,000 feet and plugged in on the standard air column the instrument would indicate 10,000 feet. However, if the air column commences to cool, a curious process will develop. Recalling that the particular standard air column we are dealing with is trapped in a cylinder it is easily seen that if the air in the cylinder cools it will flow earthward.

Under these conditions pressures all the way up will change. Note, also, that having trapped the air in the cylinder there cannot possibly be any change in sea level pressure no matter how much we heat or cool the column. We started out with a sea level pressure of 29.92 inches of mercury or 14.7 pounds of air. Heating or cooling it is not going to change the *amount* of air.

Granted that under these conditions any changes of temperature throughout the column will not change the amount of air we started out with, then the only changes in pressure will be at altitudes *above* sea level. For example, we know the weight of the air above the 10,000 foot level was 10.11 pounds. Suppose after cooling there are left only 9.11 pounds and that a pound of air has flowed from above to below the 10,000 foot level. Then

$$\frac{14.7}{29.92} = \frac{9.11}{x} \text{ or } 18.6 \text{ inches of mercury}$$

The drop in pressure is nearly two inches. Obviously the indicated altitude under such conditions would increase enormously. The reader probably will have realized that the so-called temperature correction is, in essence, a correction made for changes in *pressure* at altitudes above sea level. These changes in pressure are caused by heating or cooling the air column.

Altimeters are constructed in such a manner that no matter what you "set" in the window of the instrument the pointers of the altimeter will indicate height above or below the particular pressure value. If you set 29.31 in the window and your pointers show plus 1,500 feet you are 1,500 feet above a point in the air column the pressure of which is 29.31 inches of mercury. If you set 28.1, the lowest value on most setting scales, and the pointers show a minus 1,200 feet it merely means you are 1,200 feet (plus or minus any of the so-called temperature errors) under a point in the column the pressure of which is 28.1 inches of mercury. Then, obviously, because it is the custom to measure height in terms of mean sea level, all you need to know is the sea-level pressure in your vicinity and set it in the window. Then, provided the air column is standard in respect to temperature the altimeter will indicate accurately. The fact that you might be landlocked 1,500 miles in all directions is irrelevant because weathermen can easily convert a pressure taken at a surveyed elevation of 3,500 feet to its sea level equivalent, and that is what *you* want.

Therefore, the *altimeter setting* is any pressure corrected to sea level. Towers will get it in practice by turning the pointers of the tower (or range station) to the surveyed elevation of the source of static pressure. In a tower located at a point 1,576 feet above sea level and in which the static pressure is taken 40 feet above the runway the tower operator turns his pointers to 1,576 plus 40 or 1,616 feet, reads the value in the window and broadcasts it to you.

Once you have brought your altimeter setting up to date you now may read your *indicated altitude*. By definition, an indicated altitude is your height in feet above mean sea level plus or minus any mechanical errors in the instrument and any so-called temperature error. In domestic flight air traffic control procedures require that a pilot fly at an *indicated altitude*. This is not your true altitude. Changes of temperature may make your indicated altitude as much as 2,500 feet above or below your true altitude. Nevertheless, you fly this value. The practice of flying a true altitude is impractical. Every airplane in your vicinity will share the same error so, provided you have sufficient terrain clearance, the control of vertical spacing is simpler by this method.

In many parts of the world there is no altimeter setting information. Frequently no one has the foggiest idea what pressures lie ahead of the pilot. Therefore, particularly in the Air Transport Command, over water, and in many scattered regions pilots are instructed to fly a *pressure altitude*. This term need bring no trembling. A pressure altitude may be read off the altimeter after setting it to 29.92. Your pressure altitude is your height in feet above or below the points in the air column with a pressure of 29.92 inches of mercury. This standard pressure moves up and down, above and below sea level and one can see that it is only satisfactory in keeping you spaced from other aircraft in the same vicinity. You have no idea how high above sea level you really are.

However, in computing your true altitude, provided you have the proper altimeter setting, it is necessary to know your pressure altitude. Most military aircraft are furnished with at least two altimeters. The pilot's altimeter is usually set to the current altimeter setting, and the co-pilot's altimeter may be flown with a pressure altitude setting.

However, there are many ways to read pressure altitude besides the conventional method of setting 29.92 in the window. One of them involves the use of the little white triangles, called indices or reference markers.

Reference markers are standard on all Air Corps sensitive types of altimeters.

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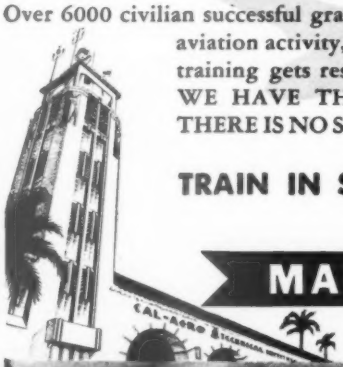

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Originally they were used in altimeter setting procedures, prior to the introduction of the setting window. In the old days a pilot flew over a range station, called in and asked for the pressure altitude variation. This is a value in feet. If the range replied that the pressure altitude variation was minus 450 feet the pilot rotated the setting knob until the reference markers had traveled counter clockwise a total of 450 feet. This is equivalent to setting 30.42 in the window of current types. Commonly, one may say that the pressure of 29.92 has moved 450 feet above sea level.

If you set a modern altimeter to 30.42 the reference markers will show a counter-clockwise travel of 450 feet. If you set the altimeter to 29.92 the reference markers will be zeroed at the top of the dial. The motion of the reference markers can only be controlled by turning the setting knob. They will always move in an equal and opposite direction to the hands of the altimeter. Supposing the altimeter is set to 29.92 and the hands indicate 1,200 feet. This is the pressure altitude of the static source of instrument. Now, if you turn the setting knob until the hands indicate zero, the reference markers will indicate 1,200 feet. Therefore:

A second method of measuring pressure altitude is to zero the hands and read the reference markers. They will merely exchange positions with the hands.

The third method of reading pressure altitude is to get the correct altimeter setting. After making this setting you can read an indicated altitude. Also the reference markers will have rotated a few hundred feet, either clockwise or counter-clockwise. If they have moved counter-clockwise the value in the setting window will be higher than 29.92. Assuming a setting of 30.42 the reference markers will be 450 feet to the left of counter-clockwise of zero, their standard position. Now, supposing the pointers indicate 2,000 feet we have:

Indicated altitude	2000 feet
Pressure altitude variation	minus 450 feet
Pressure altitude	1550 feet

Neither of these other two methods possess any practical value to the pilot, yet an understanding of them is important in using the altimeter under conventional methods.

Most pilots know that when the pointers are turned to zero the window reading will correspond to the actual pressure surrounding the instrument. On a certain day a pilot zeroes his pointers and the window reads 29.11. Assuming the airplane is standing on the runway 29.11 is the actual pressure at the runway—or the *field level pressure*. Now, whenever the pointers are zeroed the reference markers will measure pressure altitude. Therefore, if an airplane 10,000 feet above the runway was making an instrument letdown with an altimeter set to 29.11, the field level pressure, the altimeter would register zero when the airplane landed.

If the pilot of the airplane had set his reference markers to the *field pressure altitude*, the same result would have been obtained.

The conventional letdown procedures are published in height above sea level. In practice a pilot may not actually make a procedure turn at 4,500 feet above sea level, as the letdown manual requires, but rather he will make a procedure turn at an *indicated* 4,500. In any event his altimeter will have been set to the current "altimeter setting" and his instrument will read an indicated altitude above sea level.

However, many military aircraft are still not equipped with radio altimeters. Therefore, if the pilot has two altimeters, he can use his second altimeter as a runway indicator by calling for an additional setting. In practice the common procedure, standardized though infrequently used in the armed forces, is to request:

1. Altimeter setting for the sea level indicator.
2. (If the runway is under 1,200 feet) field level pressure, setting it in the window.
3. (If the runway is over 1,200 feet) field pressure altitude, setting it clockwise with the reference markers.

Either of the last two settings made on the second cockpit altimeter affords the pilot an accurate indication of height above the runway, plus or minus instrument and "temperature" error. In any event the last two settings will give him a zero reading when he lands, within the limits of the altimeter.

A better procedure to get zero indications would be to call in for the field pressure altitude at all airports and set it with the reference markers. Policy, however, and the assumption that a pilot will have less trouble with the window, has determined otherwise.

The problem of altimeter usage may be reduced to a few simple rules. If the pilot flies from any pressure to a lower pressure without resetting the altimeter and while holding a constant indicated altitude, the airplane will trace out an isobar through the atmosphere. In this case the isobar will approach, as will the airplane, the earth's surface. We say that the indicated altitude will be greater than the true altitude.

Again, if the temperatures throughout the air columns encountered by the airplane decrease below standard, even though the sea level pressures en route remain constant, the altimeter will have overindicated. When the temperature decreases at any surveyed level, air will flow downward. The weight of the air above the level will decrease, consequently the pressure will decrease. Consequently the altimeter will overindicate.

Corrections for changes in sea level pressure are made by keeping the altimeter setting up to date. Corrections for changes of pressure above sea level brought about by heating or cooling of the air column are made on standard types of computers, such as the E-6B, Mark VII and others.

For additional security a pilot may land with two altimeter settings, one giving him an indicated altitude above sea level, the other giving him an indicated altitude above the runway. END

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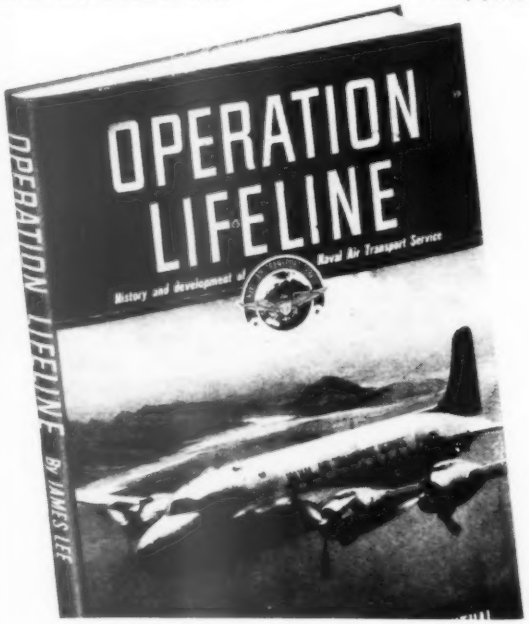

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Don't Sell Private Flying Short

(*Continued from page* 18)

planes decrease and utility increases.

The distribution of registered aircraft by counties and states affords a good means of determining how the aircraft activities and interests are divided throughout the country. A report released by the CAA on June 1, 1947, shows this distribution by county and state as of January 1, 1947. California had a registration of 8,456 airplanes or approximately 10.5 per cent of the total, followed by Texas, with 7,789 or slightly over 9.6 per cent of the total. Distribution on a population basis is shown in the map on page 16.

The establishment of a good, stable service business by all dealers and distributors cannot be too strongly emphasized. The president of a large engine manufacturing company recently said that the service department and the volume of service business is the backbone of any well organized dealer-distributor organization. Those organizations who have given attention to this subject in the past have demonstrated that they are the ones who come through the seasonal decline in sales, recessions or other business cycles. The dollar volume of maintenance work, sales of accessories, fuel, oil, etc., can exceed that of the sale of airplanes. If you doubt this, compute the estimated operating costs of the airplanes in your territory and compare it with the volume of new sales.

In general, the personal airplane manufacturers did not give the export market in 1946 the attention it deserved. They had difficulty supplying the local demand. As a result, exports in 1946 were disappointing. The 11 manufacturers who reported export data to the Aircraft Industries Association showed that only 1,383 airplanes having a value of $3,298,342 were exported in the year 1946. This represented only a little over four per cent of the 34,309 airplanes of less than 400 h.p. built in the USA. as shown by department of commerce data.

Considerably more effort has been placed on the export market in 1947 with the result that for the first seven months the 11 manufacturers reporting to the AIA exported 1,094 aircraft for a value of $4,125,535. This represents 9.45 per cent of the total production of these companies and 11.02 per cent of the dollar value.

Continued emphasis on exports to countries below the equator and those which enjoy good year-around flying conditions will help increase production during the latter part of 1947, when sales are usually low.

Canada was the best customer for the first six months of this year according to the AIA data and imported 175 airplanes from the USA. Argentina was second with 123 airplanes, Mexico third with 56, South Africa fourth with 47 and Sweden fifth with 38.

A review of the basic data previously used to arrive at a rational estimate of personal airplane production indicates that the methods were good and can be used to estimate probable production for 1948. Based on the absence of a general recession in business, the industry should be able to sell 25,000 airplanes in 1948. Continual improvement in utility and in hangars, airport and service facilities should see this figure increase materially in 1949.

The prediction of this volume of aircraft sales takes into account the improvement which has been made in dealer-distributor organizations and the improved methods of selling, which have been adopted by a large majority of them. Another encouraging sign is the increase in facilities for airplane housing, airplane service at reasonable prices, and good airport planning.

Another very important factor is the trend toward lower operating costs and lower first costs. The trend toward lower first costs will be particularly noticeable in the two-place plane and in four-place family-type craft of moderate power and performance.

One of the foremost signs of progress is the continued increase in the use of the airplane by business organizations, the farmer, the sportsman, and the individual whose business activities require frequent trips of 150 miles or more. These persons represent a substantial number but by no stretch of the imagination can they equal the number of other persons who travel inter-city only on vacations and other infrequent occasions. Predictions on potential airplane sales must be realistic and take the following facts into account.

1. More and better located airports have done a great deal to reduce the time lost in travel to and from airports. Some airports already provide Drive-Your-Self facilities for the convenience of the itinerant flyer and as traffic grows more of these facilities will become available.

2. The use of the airplane by the farmer has resulted in a high degree of utility. The flying farmer movement is growing rapidly because here is an application where the landing and take-off facilities are practically at the pilot's door and the distances to be travelled are well within the practical limits of airplane utility.

3. The increasing use of airplanes by business organizations as part of their regular business activities. The spreading of manufacturing facilities rather than concentration in any one area is going on continually. This condition, plus the establishment of new manufacturing facilities in the south and west coast areas which sell to the high consumption areas in the east north central and north Atlantic areas all require increased travel. The airplane can be and is being used with a high degree of utility.

4. Increasing interest is being shown in state-CAA sponsored air education programs. Twenty-eight states now have complete aviation education programs and 12 more are working on plans with the aid of CAA consultants.

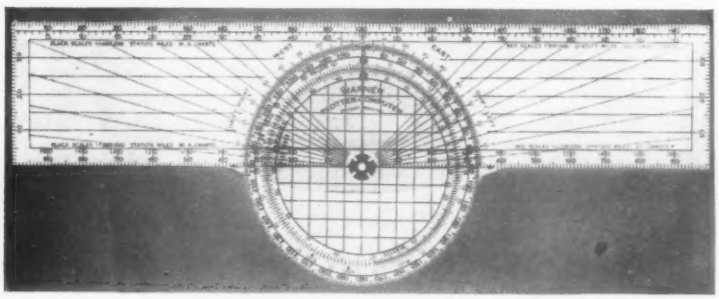
5. Colleges and universities show growing interest in student veterans' participation in flying training under the G.I. Bill of Rights on regular school schedules.

6. The establishment of the first skyway for touring airmen between Los Angeles and Washington designated as Skyway No. 1 was recently announced by the CAA. (See "Highway in the Sky," page 33.)

7. Keen interest is maintained by the Civil Aeronautics Administration in personal flying.

8. Industry-wide cooperation is evidenced by one of the major engine manufacturers devoting its advertising campaign to industry promotion through its "Start Flying Now" advertising.

9. The desire to fly and the enthusiasm



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SIX standard navigational devices are incorporated into the newly-marketed Warner plotter-computer produced by Warner Sales Company, Chicago. The plotter-computer combines straight edge, dividers, protractor, parallel rule, drift scale and circular slide rule.

With the device the navigator can measure distances on aeronautical charts; measure courses as true, magnetic or compass; solve all types of wind problems; and indicate drift angle from checkpoint information. The plotter-computer also serves as a straight edge for drawing course lines and bearings; plots true, magnetic, compass or relative bearings; solves fuel consumption problems; converts nautical miles to statute miles to kilometers; and solves problems in multiplication, division, proportions and ratios.

It is made of laminated vinylite.

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for flying which is continuing to develop in so many people should have a very beneficial effect in increasing the use of the airplane for pleasure as well as for business. In this respect also, the use of the airplane for pleasure should not be overlooked as one of the measures of utility.

10. Improvements in design are underway to give better performance, safety and comfort, such as shown by the trend towards metal construction, castering landing gears, noise reduction, non-icing induction systems, improved streamlining and many other features appearing in the new airplanes.

Many other signs of progress are on the horizon. The personal airplane industry has gained enough momentum to show the type of growth it is capable of. I refer not to any fantastic production figures, but to a good stable business operated on a rational and realistic schedule. Don't sell it short! END

Pipeline Air Force

(*Continued from page* 15)

That one item—pipeline inspection—should save the Aramco organization enough to make the planes pay for themselves. Leaks along the pipeline can be located in a matter of hours now, though it used to take days or weeks for Arab pipe patrols to trek through the heat and dust on foot.

But operation of planes in the blistering heat of Saudi Arabia is no cinch. Take the matter of climate. The mercury does everything but outside loops during a year—and the five *Navions* will be baked in temperatures which regularly bounce up to 130° and higher. Planes and powerplants take a beating from this heat, what with thinned oil, overheated engines and the continual blast of fiery air on the ground. Metal parts become too hot to touch, and interiors are almost unbearable except in flight. This super heat is tough on tires, insulation and instruments, to say nothing of crews and passengers. Then there is the dust. No filters have been developed to keep it out of every part that moves. It works its way into watches, cameras, instruments, engines. After a few hundred hours, handfuls of dirt can be scooped from oil sumps and other parts of the powerplants. Engine replacements are merely a part of routine maintenance.

The *Navions* destined for Saudi Arabia won't have the paint jobs shown on the cover for long. The identification numbers and the name "Aramco" disappear quickly under the stinging abrasive of wind-driven pumice that fills the air. But bright metal is easier to spot in desert wastes than color, and the maintenance chap wielding the brush is kept busy enough repainting identification numbers.

Ever since 1930, when King Ibn Saud asked American oil men to explore his country for petroleum, the airplane *should* have been the way to prospect the vast deserts. But only recently has that "should" been realized. The war helped and the American oil men's impatience helped more. Since last February the airplane has taken its rightful place here.

Aramco now has one of the largest privately-owned "air forces" in civilian use. There are two four-engined Douglas DC-4 transports, one a plush job for personnel and the other a strictly cargo job; eight twin-engined Douglas C-47 transports; two single-engined four-passenger Fairchild transports; one twin-engined Beechcraft transport; one 10-passenger single-engined Noorduyn *Norseman;* and the new fleet of five Ryan *Navions.*

Dhahran Airport, main Aramco base, was built for AAF. It has personnel homes, repair shops, hangar, supply sheds and two 6,000-foot runways.

All the aircraft, including the little fleet of *Navions,* are fitted with the latest in navigation and blind flying instruments, including automatic direction finders, gyro instrument panel, and extra fuel tanks. They all carry food and water on long over-desert hops. Most of the planes were flown to Arabia but the *Navions* went by boat to Ras Tanura about 28 miles north of Dhahran to which they were trucked for assembly.

Under the direction of E. S. Maloney

veteran ATC flyer and chief pilot for The Texas Company, the planes are ready on a moment's notice to leave for any point anywhere. There are eight pilots (paid $800 monthly), 10 co-pilots (paid $500) and 200 additional trained personnel to fly, service and maintain the planes.

During summer, a north wind blows here most of the time. When the wind is up to its usual routine, a screen of fine sand whirls over the ground. Above the swirling sand is a "fog" of fine dust for several thousand feet more. The only way to escape it is to go higher, much higher, or book passage for the States.

If you decide to go higher, above the dust, you find you are smack in the middle of giant thermals. The superheated sands launch vast areas of hot air boiling upwards to over 10,000 feet. Chief Pilot Maloney told the author it is so rough on some days that you can hardly sit in a plane, let alone fly it. Safety belts are a universal must, and the native workers are invariably sick as soon as they leave the ground. This makes servicing the planes an anything-but-romantic chore for the ground crews.

Aramco fields are either excellent—or the opposite. At Dhahran, for example, there is an excellent field built originally for the AAF where planes can luxuriate in two 6,000-foot runways and have ample hangar space and shop equipment. Other fields about the company's area are made via the bulldozer and snow fence system. The bulldozer shoves aside the fine powdery sand right down to the gravel subsurface, or even down to the concrete-like hardpan beneath the two top layers. A border of snow fences is installed to keep the ever-moving sand from sneaking back during a windy night. If emergency landings have to be made away from a field or flight strip they are made with wheels up if possible to prevent nosing over in the sand.

Roads are important not only for surface vehicles but to the Aramco fleet. But because of the drifting sand and the fine dust in the air, navigation is usually by instruments. When possible, the pilots fly contact along the roads which are made by bulldozing straight through the riffled dunes and then oiling the swath.

Both the aircraft and the flying personnel operate under CAA regulations, for they must be qualified to fly to the U. S. at any time. Observance of CAA rules is also good insurance that crews and planes will be in top notch condition at all times.

The flying personnel maintain their tickets by extra flying if necessary. Co-pilots do most of the single-engined flying, so they can log more landings and take-offs. Most of the multi-engined use is for long flights, with a single landing and take-off at each end—and the pilot in charge is usually credited. The new *Navions* will give some of the pilots a real chance to log extra time.

The two DC-4s, both the plush job and the cargo version, make two round trips to the States every month, carrying about 30 passengers or a load of high priority cargo. The crew of the plush job is complete with all trimmings—including a hostess. Thirty hours in the air gets you there or back. The planes leave New York at noon, going via Gander, Newfoundland, to Lisbon, arriving there about 11 the next morning. The following day they hop off again for Cairo and the company bases to the east, making it in three days in the same luxury as the regular cash-on-the-barrel-head lines.

The fleet of Aramco aircraft deserves much credit for the success of tapping oil from Arabian sands. And, certainly, the Aramco aircraft should never have to land because of dry fuel tanks. That would be *really* embarrassing. END

Report from Washington

(*Continued from page* 55)

a recent air carrier accident involving fire aboard the aircraft," the CAB explained, "has indicated that the landing flare equipment located in the wing root section adjacent to the known fire area may have contributed substantially to the intensity of such fire." Other regulations may follow when the investigation is completed.

What they will involve is anybody's guess but some idea may be gathered from a statement made by David L. Behncke, president of the Air Line Pilots Association, after the October 24

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tragedy. Among his recommendations regarding fire on aircraft he suggests building planes so that the greatest possible number of areas (including baggage compartments) be accessible during flight; that carbon dioxide fire extinguishers be replaced with ones more effective on a smouldering fire; that more care be used in installing and insulating electrical equipment; that a non-inflammable hydraulic fluid be developed, as well as cell gas tanks instead of integral fuel tanks, and that "gasoline cabin heaters with attendant fuel lines and electrical connections" be junked.

Package Rates

From the West Coast comes a story that might be worth the while of many a fixed-base operator to study. It concerns a double-barreled personal plane pilot plan devised by the Boller-Sand *Ercoupe* Flying Club, an operation at Grand Central Airport, Glendale, Calif. Out for new business and with an eye to the future, the club rents new planes (with radio) at a flat rate of $18 a day, including weekend days. Pilot pays for gas and oil.

Early reports are that pilots are taking to the deal with gusto and new planes are being added to the rental list every week. Second package is for anyone wanting to learn to fly—$175 on a time-payment basis that has been okayed by local banks. The course includes ground school, flight time, text books, and permanent membership in the flying club—which entitles holders to flight time at 10 per cent off after completing the course.

Skyway One

The year 1948 may bring a skyful of dark clouds to the personal aircraft business but there will be at least one silver lining. This is the dedication and (everybody hopes) frequent use of Skyway No. 1 (See Highway in the Sky, page 30), first transcontinental marked airway for private planes, from Washington, D. C., to Los Angeles. Dedication is set for Saturday, April 24, by John A. Reilly, president of the Washington Board of Trade and one of the ring-leaders in the Skyway project. Mr. Reilly adds that he hopes "next spring will see many of the 5,000 towns and cities on the skyway route ready with airmarkings." He's also an optimist, this Reilly. "The weather all across the country," he says, "should be very favorable for private flying by a month after Easter."

From the Los Angeles end of the line, Glen B. Eastburn of the L.A. Chamber of Commerce reports extensive plans underway, and in between come scattered reports indicating that the skyway idea is getting a lively reception. Stanley Draper of the Oklahoma Chamber of Commerce reports plans for a gigantic chuck party on the big day, with guests invited from all over the Southwest. Even off-course towns are joining in the airmarking drive, as witness Gainesville, Mo., pop. 300, just south of the northern arm of the new skyway as it veers north of Abilene, Tex., toward St. Louis.

Gainesville's flying mayor, H. T. Harlin, took care of the airmarking job and added a flight strip to boot. "I think all towns," says the mayor, "regardless of size, should be marked." Doesn't cost much, either. Even a tailor-made job, CAA-approved, is less than $100. Or you can do it yourself with volunteer help.

Army's Choice

Some time ago the Army Ground Forces told the Air Force that they wanted new planes for liaison work. Air Force immediately went to work with manufacturers testing two types—two-placers for observation work, four-placers for liaison. Results of the tests gave the nod to Aeroncas (two-place) and Ryans (four). The decision means orders to both builders, since the Ground Forces reported need of 386 liaison aircraft during the next two years. Air Force refused to say why they picked the planes they did, or what planes were tried and found wanting.

AF Expansion

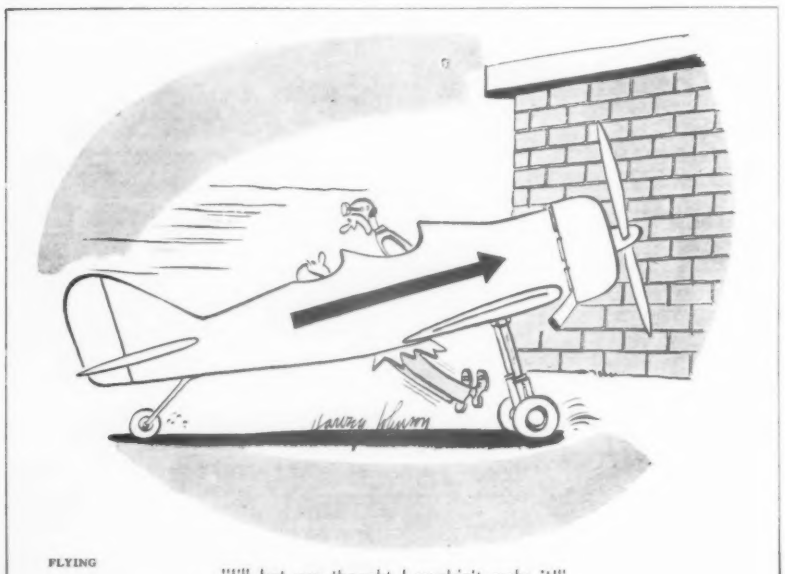
Air Force, though still handicapped by budget trouble, plans to do some expanding on its own this year. AF pilot training program for 1948 will be tripled. About time, too—the present number of rated aviators in active service is 21,000, less than half of the 43,000 flyers called for as a minimum number for adequate security. Aviation cadet classes will be expanded to take in about 3,000 instead of the 1,000 trained in 1947. Two out of three cadets will win their wings, it is estimated, which will give AF 2,000 new pilots by the beginning of 1949.

In the drive for cadets, AF has streamlined the qualifying tests and upped the number of examining boards from three to 55. "Psychometer tests," which involved too much equipment, have been ditched. To qualify for testing, pilots must be single, between 20 and 26½, and have two years of college or its equivalent. If you pass, while in training you get $75 a month plus a buck a day for groceries; free uniforms, and a $10,000 paid-up life insurance policy. Graduation gives you a reserve second lieutenant's commission and a top income of $372 a month. You can also compete for regular USAF commissions.

New Era?

A straw came down the wind the other day that may be most significant to aviation's future even beginning next year. This is the recurring rumor that CAA and a lot of other people—especially in the lightplane and transport fields—aren't too happy about the way air races are styled these days. When a plane was a sensation if it went 200 m.p.h. meets were exciting to the spectators and not too dangerous to the participants. But these days, with near-sonic speeds, spectator participation in any given race is measured in terms of seconds and the hot stuff coming in low is a menace not only to the paid customers but to anybody else on the ground for miles around.

So seriously is this being taken that CAA may balk at a permit for the Cleveland National Air Races in 1948, at least as at present constituted. Too dangerous, too damaging to present-day aviation. An alternative is offered by one of CAA's personal flying specialists, Charles E. Cox, Jr., who believes that the emphasis at such meets should be on lightplanes. As an example, he offers the suggestion that Cleveland feature such events as a roadable airplane race as soon as possible. Pilots with planes minus wings could line up at a starting line, race to their wings down the field, mount them, take a few turns around the pylons, land, detach wings, and race back to the starting line. Similar lightplane events could be emphasized, with only the most significant of the old-time, long-distance races retained on the program. Stunting would



"I'll bet you thought I wouldn't make it!"

be at a minimum, and ultimately would be completely eliminated.

Cheers!

We heard the other day what really happened to the passengers in that DC-4 that suddenly turned upside-down and then resumed normal flight. One of them —Charles C. Colvin, a member of the President's Air Policy Committee—was aboard, and found himself slowly sliding up the wall. Finally he was sitting comfortably on the ceiling, looking up at other customers who had their seat-belts strapped and looking around at others who hadn't and who, as he was, were sitting on the top of the cabin.

In the plane's cockpit, as this was going on, co-pilot Melvin D. Logan, a reserve captain with American Airlines, was making a hero of himself. Colvin, an old-timer himself, figured that there was enough altitude to right the plane, and that the pilot would do it. So Colvin gradually worked himself up to his seat which, as gradually, took its proper position. Other loose passengers did likewise.

There were a number of babies aboard, but their mothers held on to them for grim death and they were not hurt. Indeed, the only injury was to an elderly woman, who suffered a bruised leg. Another woman had hysterics after the plane landed, but while airborne everybody was calm. They were even better than that, as a matter of fact: when the plane finally resumed normal flight, everybody aboard spontaneously began to clap. Mr. Colvin is sure, however, they weren't seeking an encore. END

Cross-Country Guide

(*Continued from page* 32)

over several continents before Cook was finally able to get it on the presses—but everywhere he turned he ran into people who shoved orders at him, several thousand being in his hands before the book even went to the printers. The 25-year-old Indiana State graduate rounded up several of his friends hurriedly and incorporated the National Aero Service last spring.

Cook himself took 500 shares of the 1,500 originally issued in the corporation. He stuck 250 back in the safe as "company property" and sold the remainder to friends. Rahe Hornung, vice-president of Terre Haute's Aviation Board and owner of a successful shoe store in the Indiana city, liked the idea. When asked about joining the venture, he didn't hesitate: "Tell you what I'll do," the ex-Air Force major volunteered, "I'll back you this far: You can use my Globe *Swift* for transportation; and I'll advance you enough money to travel." And he bought 50 shares of N.A.S. stock.

That was all Cook needed. He wrote to Robert Walkinshaw of Laramie, Wyo., and asked him to join the outfit as western manager—to tour the west in his Luscombe, collecting data on airports. It wasn't too hard to enlist the Wyoming rancher because 25-year-old Walkinshaw

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was that other lieutenant who had helped hatch the idea back in that Chinese air base tent.

Then Cook really started to expand. He met John D. Tucker, 25, a former Eighth Air Force *Mustang* pilot, who was graduating from DePauw University at Greencastle, Ind. "Let's include Alaska," Tucker suggested. And they did. Then off Tucker started during the summer for Mexico and Canada, lining up airports there for inclusion in next April's edition.

Cook decided to handle the Middle West territory himself, checking airports in Hornung's *Swift*. Walkinshaw was batting through the west in his Luscombe. And the company raked up enough money to buy an Aeronca *Chief*. The company still had to survey airports in the east and south.

Cook contacted Bernard P. Hunt, 23, his roommate at Indiana State and a former radio gunner on a *Marauder*. Hunt ditched his job with a farm machinery manufacturing company and headed south, tabulating material in the southern part of the United States. An ex-Navy flyer, 23-year-old Odus Baldridge of Terre Haute was enthusiastic about the idea too. So he was set to work in the east. But Baldridge (who owns a *Swift*) took the deal only on a temporary basis; his ultimate assignment, says Cook, will be in Canada and Mexico, where he'll be foreign manager for the Guide.

Cook was surprised at the initial response to the Guide. When orders poured in even before publication date, he enlisted his wife, Nelle, as bookkeeper—but still wasn't able to handle all the work. Wives of the other flyers were pressed into service and an office opened in suburban Terre Haute.

The mail—still before a single Guide had been published—was varied. Most asked for copies of the book but other requests were received. A Navy Commander in San Diego, for example, asked them to plan a cross-country flight from San Diego to Boston, giving him all information on airports and sending him necessary charts.

That gave Cook another idea, which he plans to incorporate in his scheme before too many more issues of the Guide go out to customers. The National Aero Service in the future will give help similar to that now given to motorists by automobile associations. Trips will be planned, routes selected, airports picked and charts mailed to subscribers on request. N.A.S. also plans to issue a credit card which will be honored at recommended airports.

Cook believes his book fills a definite need for private flyers. A person wanting to make a cross-country hop, he says, has no place to turn for really discerning information on good airports. He can consult CAA charts but they show *every* airport—good, bad, indifferent. Snappy service, convenient hotels, good food aren't listed by CAA inspectors—and that kind of information can't be put on CAA charts. Neither, Cook points out, can present airport guides fill the bill. They give information about airports but no indication of the personal service facilities on the field, cost of taxis, best places to stay, fees or good restaurants.

The job of collecting this information was not easy. It involved research and personal visits by members of the National Aero Service staff. Before covering a state, the staff member consulted available printed data on airports, selecting and rejecting possibilities for lightplane stopovers or refueling points. They excluded large airports with heavy traffic and also tiny airports without facilities. Then, they made a personal canvass of pilots who had flown in the area, asking them about the best fields and the best service. From these conversations a list was compiled in which airports were geographically distributed so that a pilot in a lightplane could have convenient refueling and stopping points, regardless of the direction he was flying. Then the district manager personally flew the terrain, stopping at airports, checking them, and selecting the best for inclusion in the Guide. The entire nation was covered in this manner by the flyers before the book was compiled.

Still unknown, except in theory, is what the company will do if readers complain to N.A.S. about the caliber of airports listed in the Guide. Cook promises the fields will be eliminated from subsequent editions if the semi-annual inspection proves they no longer meet standards. Though most of the airports have contributed $30 to a fund for publicizing each edition, Cook insists that the fund is not used for N.A.S. operating expenses—and that standards of quality will not be waived regardless of funds contributed by the approved airports.

Operating revenue and profits, he points out, will be derived solely from sale of the $1 Guide, which will be retailed directly by N.A.S. and through airports. Income should be great enough, stockholders believe, to allow a reasonable amount of profit—and to enable the company eventually to purchase additional airplanes.

First issue of the Guide includes a map of the U. S. on which all recommended airports are indicated. In another part of the book airports are listed by states, with specific information on each field, including a copyrighted silhouette diagram of runways, name of the field, name of the manager, phone number, location of runways, markings, facilities, fees, gasoline grades available, repair facilities, airport restaurant facilities and hours, transportation, taxi phone number and charges, a recommended nearby hotel, and a recommended convenient restaurant. The book also contains information on recreation possibilities in the area, and special services at the airports.

"Our big problem," says Cook, "is to win the confidence of airmen. We can't put out a good book unless we give reliable recommendations." The president of the N.A.S. has no misconceptions in that regard. "Flyers won't buy a Guide they can't trust," he believes. "That's the reason we're double-checking every recommended airport—it's really self-protection."

Officers of the N.A.S. are Cook, who's president; Tucker, vice-president; Hunt, secretary-treasurer; and Hornung, business manager.

The task of tabulating airports all over the U. S. might have stopped other lads in their twenties. But these ex-military flyers aren't daunted by the distances or the immensity of the project. "We covered a lot of territory during the war," Cook remarked, "and we're not going to stop now." END

FLYING
"You come down this instant and fasten your safety belt just like everybody else."

The Case for Shoulder Straps

(*Continued from page 34*)

"Q." does have buckles. But the truth is that buckles are not so good as the original series of holes and the reason is found in the psychology of pilots.

Incidentally, the Army placed the shoulder harness in the "Restricted" category until November 28, 1945. But somehow or other the news got around, despite the Air Forces efforts at secrecy. The RAF had a shoulder harness and so did the Germans.

The AAF shoulder device consists of two lengths of 1¾-inch webbing, which pass over the shoulders and over a bar at the back of the seat, where they are joined and attached to a locking mechanism. Metal fastenings at the front ends of the straps fit into the tongue of the seat belt lock. The throwing of a single lever releases shoulder and seat straps simultaneously.

After the harness is adjusted and hooked into the seat belt fastening it can be controlled by a lever on the left side of the pilot's seat. When the lever is in the unlocked position, the shoulder straps are loosened, allowing the pilot to lean forward and turn his shoulders freely. The locked position puts tension on the straps and holds the pilot firmly against the back of the seat.

Not only were vastly fewer pilots injured in belly landings when wearing shoulder harness, but those hurt suffered lesser injuries, as a rule. A couple of case histories from AAF records are worth quoting:

A pilot made a forced landing without power in sand dunes, with safety belt and shoulder harness tightly fastened. He decelerated so rapidly that the engine was torn out of the plane and the firewall and instrument panel went with it. The pilot found himself in a seat with nothing in front of him except a large expanse of sand. He was uninjured except for superficial bruises which resulted from the pressure of the shoulder straps, which undoubtedly prevented him from incurring serious injury, if not losing his life.

Taking off with full fuel tanks and a load of chemical spraying solution, the pilot of a *Thunderbolt* got airborne at 110 m.p.h. near the end of the runway, but the plane stalled and settled slowly, the wheels striking the edge of a ditch while still retracting. The landing gear sheared off, the plane flipped on its back and skidded upside down for 200 feet. The *Thunderbolt* was a total loss. A rescue crew found the pilot, upside down but still firmly strapped to his seat by safety belt and shoulder harness. He escaped with abrasions of the chest, shoulders, neck, scalp and right leg.

The Navy, a little quicker than the Army at recognizing a good thing, adopted shoulder straps as standard equipment in 1942. They were specified for all *Wildcats* in a directive issued June 18 of that year. The Navy's experience on both water and land was virtually identical with that of the Army. Whenever a pilot had even partial control of his plane and was able to achieve any sort of gliding approach to a crash, the shoulder harness usually meant the difference between terrible injuries or death, and minor hurts. In the completely uncontrolled crash, however, when the helpless pilot hurtles to sea or earth at several hundred m.p.h. in a dizzy, spinning vertical dive, neither the shoulder harness or any other device yet invented can save him.

Recently the Air Force adopted an improved shoulder harness, differing principally in the locking mechanism which applies tension to the straps. The new style is called the "Inertia Lock" harness. It is specified for all Air Force planes and in high performance aircraft it will be used in combination with the "40-G" seat by the Navy. The Navy's seat is designed to take enormous loads and is so built and anchored as to hold fast in any sort of crash that a pilot might be expected to survive.

Although the Civil Aeronautics Board does not specify any seat safety-fastenings aside from the ordinary lap belt for civilian aircraft, there is nothing to prevent pilots from installing shoulder harness in their own planes. They have even more to gain from such equipment than military pilots. Private airplanes land much slower than military aircraft. Civilian pilots, according to the CAB's medical records, suffer almost exactly the same head and upper body injuries as military pilots in forced landings on rough fields. END

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Highway in the Sky

(*Continued from page 30*)

marked and the next virtually barren of markers.

Mrs. Noyes, who has campaigned for nation-wide airmarking since 1936, says she is "more encouraged now than ever before. The skyway has taken hold of the public imagination and the need for airmarking at last is becoming apparent to everyone."

Further, official Washington has noted the interest and enthusiasm stirred up by the skyway. This may spell the difference between success and defeat in a new Federal appropriation for airmarking next year.

In general, Skyway One runs from Los Angeles to Phoenix, Tucson, El Paso, and Midland, Tex. At Abilene, Tex., the skyway splits into north and south routes, with the northern route going into Washington via Wichita Falls, Oklahoma City, Tulsa, Springfield, Mo., St. Louis, Terre Haute, Indianapolis, Dayton, Columbus and Pittsburgh.

The southern route is charted over Ft. Worth, Dallas, Shreveport, Jackson, Miss., Montgomery, Ala., Atlanta, Spartanburg, S. C., Greensboro, N. C., Richmond and into Washington.

The sign which keeps the coast-to-coast pilot on course and out of trouble is a large numeral 1, flanked by two wings—Skyway One's official insignia. Flyers will find it dotted liberally along the route with the standard CAA markers they already know.

The Los Angeles Chamber of Commerce and the Washington Board of Trade, which spearheaded the skyway project, hoped that skyway airmarking costs would be borne by the civic groups and municipalities along the route. As it has worked out, the job has been financed partly by civic groups and local governments, partly by state funds, and by the money which remained in a $100,000 Federal appropriation for airmarking.

As was expected, state-by-state response to the skyway was varied. In Arizona, which has an active state airmarking program, the idea caught hold immediately. Civic groups, pilots and operators were 100 per cent behind it. Newspapers in Phoenix, the *Republic* and *Gazette*, sent out a special plane and pilot, Lee Ackerman, to drum up skyway business in towns along the Arizona route.

As a result every Arizona town of 100 or more is now marked. One hundred new markers were expected to be in place by the time the inaugural party went through in November.

On the other hand, Texas was handicapped by its vast stretches of isolated territory. In Mrs. Noyes' opinion, it will take a concerted effort from all civic groups to complete the job in Texas.

Oklahoma newspapers have been campaigning for airmarking for months. As a result of their backing and the promotion of Eldon Stout, State Director of Aeronautics, and the Oklahoma City and Tulsa Chambers of Commerce, every Oklahoma town along the skyway was to be airmarked by the inaugural date, November 15.

Missouri, Indiana and Ohio produced "very satisfactory" results in CAA officials' opinions. All three have state airmarking programs. It is an Ohio law that each town be airmarked—and the State Director of Aeronautics, C. E. A. Brown, has instructed each town to replace weather-worn markers or those obliterated during the war for security reasons.

Pennsylvania long has held the record as the "best airmarked area in the world." Under the direction of Bill Anderson, Director of Aeronautics, the state put in 500 new standard markers the past summer plus 179 markers on forest fire towers. In addition, 79 were constructed with Federal funds.

Airmarking officials in Maryland, Virginia and South Carolina cooperated with the plan. In North Carolina, the Greensboro and High Points Chambers of Commerce, with the Guilford County Aero Club, raised $1,500 to airmark Skyway One.

In Georgia, an active state airmarking program, the still active Civil Air Patrol, civic groups and the Atlanta newspapers have given the skyway strong support. Mississippi has no state airmarking program, but some skyway support came from Jackson groups. In Louisiana, state funds and civic groups added to existing airmarkers.

Alabama used both state and Federal funds. State Director of Aeronautics Asa Rountree promised at least 200 new markers along the route by January 1.

Heads of the two civic groups which did the groundwork on skyway promotion are impressed with the dollars and cents return implicit in the skyway.

"The skyway is going to stimulate aviation in every city and town along the route. People who've never been interested in aviation will be exposed to it. Citizens soon will realize they don't have a "local airport" any more. They're now a part of America's skyways," says John A. Reilly, president of the Washington Board of Trade.

Reilly expects increased interest and trade to improve airport facilities all along the line.

C. S. Beesemyer, head of the Los Angeles Chamber of Commerce, expects the skyway "to be as useful in promoting widespread use of private planes as highway marking was in the development of the automobile."

The skyways should also prove an important aid for safer flying. Civil Aeronautics Administrator Wright says: "Twenty-one per cent of air accidents are caused by forced landings. They are the third leading cause of all crashes. When a pilot can get lost within 10 miles of an airport the safety returns from clear, numerous marking are obvious."

In spite of encouraging results from Skyway One, Mrs. Noyes is turning a realistic eye to the future.

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so on must be carried on by the Federal and state governments. Without the publicity which attended the Number One project, local communities can't be expected to do the job.

"Airmarking aerial highways is just as much a Federal and state responsibility as erecting highway route signs. Where would the automobile industry be today if the building of roads had been left to states, cities and counties without Federal aid? What pleasure would the auto traveler have with a hodgepodge of signs cluttered with ads and misinformation? Certainly the air traveler is entitled to the same service the motorist has received these past few years."

Mrs. Noyes looks hopefully to a friendly reception from the Bureau of the Budget when the 1949 CAA budget, asking $1,000,000 for nation-wide airmarking, is presented. END

The Airplane Comes to Duanesburg

(*Continued from page* 20)

combat missions and returned in one piece.

Gid wanted top-flight personnel—and he demanded the best maintenance from the first. "My friends and my own youngster are flying," he explains, "and my flight instructors and planes are going to be as near perfect as possible."

The morning a motor conked and Berical and Wilber were forced down in a snowdrift convinced Gid that the future of aviation in Duanesburg should depend on more than one plane. In the city that afternoon the only available plane for delivery was a Cessna—which was delivered that day.

A few months later his flight school had some 25 students—school kids, farmers, housewives, clerks, gas pump attendants, factory and tavern owners and a milk dealer, in an age group of 14 to 50.

Business warranted a new *Cub*.

When a group of villagers wanted to fly but felt the expense an obstacle, he organized a club of five and found them an Aeronca.

Wilber's time (he works about 18 hours a day) is divided between field and store. At the former his mania for safety drives him to a vigilant check of machines and methods.

After a session of studying take-offs, approaches and landings of students he confers with Berical and looks over the planes with Mechanic Bellinger. Then he crosses the road and inventories his store stocks, chats with salesmen and customers, plans new service.

An example of the latter came after the past winter's most paralyzing blizzard, and landed his name on press association wires.

A customer from an outlying snowbound farm didn't reach town until Wednesday to pick up his Sunday papers. When the man didn't buy a pair of snowshoes, Gid decided to fit skis to a *Cub*.

The following Sunday he and Berical were aloft early with the weekend newspapers, dropping them in the backyards of patrons.

"People like their Sunday papers on Sunday," he commented.

Behind the boyish Wilber grin, disarmingly slow, lurks a rapier mind that gives rise to his philosophy:

"Somebody has to do things. Imagine what would happen to Duanesburg or the U. S. or the world if everybody waited for everybody else.

"As to the future, it's in the air—as who and what isn't these days?" END

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Northern New Hampshire

(*Continued from page 44*)

Skier's Guide to New England," eighth edition, available directly from the New England Council, Statler Office Bldg., Boston, Mass., and at many ski shops. It is to the skier what an airport directory is to the flyer—a guide to the many places to go. It contains complete details on all New England ski facilities, and dates of important skiing events. To supplement this, the booklet has the telephone numbers of people and places to contact for on-the-spot information about skiing conditions. If there is any doubt as to whether it would be worthwhile to fly to a particular location, the answer can be had quickly.

For reports on snow conditions at some of the important skiing centers, you can phone Chamber of Commerce (800) or Laconia Tavern (434) at Laconia; Chippanock Inn (Jackson 62-6) at Conway; the executive secretary of the Eastern Slope Region (65) or Eastern Slope Inn (230) at North Conway; Nansen Ski Club (1250) at Berlin; Cannon Mountain Aerial Tramway (43) at Franconia; Sidney L. Hall (2566-R) at Concord; and Dartmouth Outing Club (285) at Hanover.

Most east coast metropolitan newspapers carry latest reports on snow conditions. New Hampshire maintains a state information bureau at 10 Rockefeller Plaza, New York 20, N. Y., which is at the service of all travellers bound for the state. Each weekend special railroad trains, busses, and private cars stream northward toward New Hampshire jammed with skiers and their paraphernalia; consequently there are always big crowds in the lodges and inns. But the airports in the area can, if given reasonable advance notice, find accommodations for flyers. The White Mountain Region Association, Woodsville, N. H., has a folder, "Where to Enjoy Your White Mountains Vacation," listing accommodations (ranging in price from $1 to $6 daily). The Winter Edition of the State Planning and Development Commission's Calendar also includes such listings.

From the pilot's point of view, there are three attractive areas, convenient because airports are near some well-known ski slopes. Near Lake Winnipesaukee are the Laconia and Wolfeboro airports, which are handy to the Laconia-Gilford development, one of the country's largest. There is a chair lift serving two "intermediate" trails and a slalom course for experts. There are also three open slopes and 10- 20- and 60-meter jumps.

North of Winnipesaukee is what is called the Eastern Slope Region, in which are the Conway Valley, White Mountain, and Berlin Airports (there are *two* "White Mountain" airports in New Hampshire—one near North Conway and the other near Whitefield, in the Franconia area). Here are located the Berlin, Pinkham Notch, Crawford Notch, Intervale, Jackson, North Conway and Conway developments, all of which are well-known to skiers.

Northwest of Lake Winnipesaukee is the Franconia Notch Region. The Cannon Mountain system has trails of from two to four miles in length, and is served by the Cannon Mountain Aerial Tramway, a cable-car system which transports tourists in summer, skiers in winter. White Mountain, Twin Mountain and Franconia Airports are near at hand.

The winter season begins around the middle of December, depending, of course, upon the vagaries of the weather, and lasts until spring thaws in April. Ski-equipped planes are the most desirable as only a few airports (Concord, Keene, and a few other airline and military fields) are kept plowed. The mountainous nature of the area should not trouble flyers, as most "mountains" are in the 2,000- to 3,000-foot category. The highest ones, such as Mount Washington, sometimes experience high winds during the winter and should be approached with caution. Winds of far over 100 m.p.h. have been recorded at the weather station atop Mount Washington. However, last winter a Piper *Cub* was used to fly supplies to that station, landing on the summit.

To plan a flying trip to the White Mountains you'll need the Boston (UV-10), Albany (V-9) and Lewiston (W-10) Sectionals. A small part of New Hampshire is covered by the corner of the Burlington chart, which might also be taken along. The weather is seldom exceedingly cold, staying above zero most of the time. No special winter equipment is needed for planes other than regular cowling winter fronts and skis. Visitors from south of the region can fly north along the Merrimac River Valley up to Concord, N. H., Municipal Airport (snow removal equipment, weather reports, all aircraft service facilities, taxi to city a few minutes from field are available). From Concord it is only a short hop to Laconia, Conway and Franconia. Concord will probably have, or can get, last-minute reports on snow conditions on airports to the north. The problem of transporting skis by plane may take some thinking. Many flyers have solved it by having a mechanic make up a pair of clamps under the fuselage, to which they can be fastened.

A flying vacation in winter time is a challenge to the private pilot. He must be willing to accept cold weather, to change his plans as the snow conditions change, and to solve problems of transporting his equipment. His rewards can be either disappointment—which can come to all skiers no matter what kind of transportation they use—or the thrill that comes with an exciting conquest of obstacles.

—Robert J. Whittier

SOME AIRPORTS of WHITE MOUNTAIN REGION of NEW HAMPSHIRE

Airport	Telephone	Nearest town	Winter Landing Conditions	Gas	Type of Services	Write:
Laconia Airport 43°35′—70°25′	Laconia 1382	Laconia 3.8 mi.	Paved, 3,500 ft. wheels & skis	80-91	Major repairs, taxi and cars, restaurant, accommodations in town	William Champlin, Mgr.
Lakes Region 43°35′—71°16′	Wolfeboro 42J	Wolfeboro, 2.5 mi.	Sod, 2,200 ft., skis, closed during thaw	80	Minor repairs, taxi and car, restauran., accommodations in town	Lakes Region Flying Service
Conway Valley 43°59′—71°08′		Conway, ½ mi.	Sod, 2,800 ft., supposed to be plowed	80-91	Repairs, taxi, meals, accommodations in town	Henry S. Hubbell, Jr., Mgr.
White Mountain 44°01′—71°66′	N. Conway 155-12	North Conway 2 mi.	Sod, 2,300 ft., skis	80	Major repairs, taxi, meals, accommodations in town	Wylie L. Artte, Mgr.
Berlin Municipal 44°34′—71°10′	Milan 2	Milan, 7.5 mi.	Paved, 5,300 ft., skis	80-91	Minor repairs, accommodations in town	Carmen Onofrio, Mgr.
Errol Airport 44°47′—71°09′	Errol 12-11	Errol, 1.7 mi.	Sod 1,740 ft., skis	80		Everett R. Eames, Mgr.
Lennington-Colebrook Airport 44°55′—71°31′	Colebrook 37-23	Colebrook, 4 mi.	Sod, 2,000 ft., skis	80		
White Mountain 44°21′—71°33′	Whitefield 46 and 123	Whitefield, 3 mi.	Sod, 2,000 ft., skis	80	Day service, taxi	Harold L. Kerr, Mgr.
Twin Mountain 44°16′—71°33′	Tw.M'tn. 317-M-6	Twin Mountain 0.8 mi.	Sod, 1,800 ft. skis	80	Service, taxi, meals, accommodations in town	Lawrence Welch, Mgr.
Franconia Airpark 44°11′—70°45′	Whitefield 123	Franconia, 2.5 mi.	Sod, 1,700 ft., skis	80	Service, taxi, meals, accommodations in town	Richard Adams, Mgr.
Lewis Field 44°18′—71°31′	Littleton 577-W-1	Littleton, 2.5 mi.	Sod, 1,800 ft., skis	80	Major repairs, taxi	James Bolles, Mgr.
Dean Memorial 44°84′—72°00′	Woodsville N-2222	Haverhill, 4.1 mi.	Sod, 1,800 ft., skis	80	Minor repairs, taxi, car	Harry E. Bassett, Mgr.
Plymouth 43°46′—71°45′	Claremont 305-W	Plymouth, 3.5 mi.	Sod, 1,600 ft., skis	80	Service, taxi	Henry Volpe, Mgr.
Riverside 43°49′—71°40′	Plymouth 296-W	Plymouth, 3 mi.	Sod, 1,700 ft., skis	80	Service, taxi	Richard Sherman Mgr.

Stinson's 1948 Voyager

(*Continued from page 50*)

speed between the two cities of 142 m.p.h. Subtracting the tail wind, which averaged 15 m.p.h. gives me a still-air cruising speed of 127 m.p.h. Which is pretty good, considering the fact that I cruised the engine at 2,500 r.p.m. instead of the recommended 2,600 r.p.m. The altitude was 2,000 feet above sea level all the way. Most of the flight was made in a moderate drizzle, and carburetor ice was so bad that I had to use half carburetor heat all the way. The ceiling was never over 2,500 feet.

Before leaving the Stinson plant for Chicago, I flew this airplane for a while around the factory field. Its gross weight at the time was 2,069 pounds, 331 pounds under maximum. Take-offs were made

STINSON VOYAGER

Type Certificate No. 767

One 165-h.p. air-cooled Franklin engine

	1948*	1947*
Wing span	34 ft.	34 ft.
Length	25 ft. 2 in.	24 ft. 6 in.
Height	7 ft. 6 in.	7 ft.
Gross weight (pounds)	2,400	2,230
Empty weight (pounds)	1,320	1,285
Wing loading (lbs./sq. ft.)	15.5	14.3
Fuel (gallons)	50	36
Cruising speed (m.p.h.)	130	124
Maximum range (miles)	554	414
Stalling speed (m.p.h.)	61.5	57
Rate of climb (f.p.m.)	580	755

* All figures apply to the Station Wagon version.

Source: Stinson Division, Convair, Wayne, Mich.

in less than 10 seconds, although there was a 14-m.p.h. cross-wind blowing on the runway. With that new sensitive rudder, it's best to take off tail down. The tail comes up by itself as speed increases and, once it does, you've got to avoid sudden rudder movements.

Rate of climb from the airport (664 feet above sea level) averaged over 830 f.p.m. Stinson claims 580 f.p.m. with a full load. Best climbing air speed is about 80 m.p.h. indicated. Stalling characteristics are the same easy, comfortable mushing for which previous *Voyagers* have been noted. You can mush along at about 55 m.p.h. using power. Which means that, in case of a forced landing, the *Voyager* can easily be slowed up and mushed into an extremely small clear spot with safety. Its wing-tip slots give it plenty of aileron control even at stalling speed.

Soundproofing has been improved over that in the 1947 model. You can talk back and forth fairly easily, and the overhead radio loudspeaker is adequate at normal volume. Quite a bit of noise (and cold air) used to come in window openings that vibrated open just a crack. This new model has a new window catch that

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locks them closed, a feature that helps with the soundproofing.

Gross weight of the 1948 *Voyager* is 170 pounds greater than that of the 1947 model, though there has been no increase in horsepower. That fact, of course, changes all the weights, loadings and some performance. For a detailed comparison between the two models, see the statistical table that accompanies this article. It will be seen that the fuel capacity has been increased 14 gallons (84 pounds), which increases the range about 140 miles.

The remaining 86 pounds which has been added to the new model apparently is in the new tail.

In any event, the airplane's performance has been edged upward too. Cruising speed is up about six miles an hour, but the stalling speed also is up 4½ m.p.h. That latter fact, however, is not noticeable when you're flying the plane from normal airports.

The day I flew that new *Voyager* back from the factory it was cold, rough, and there was an almost-constant icy drizzle in the air. Yet the airplane proved very stable and easy to fly. The new cabin heater now heats the whole cabin comfortably. You should have even less trouble flying a cross-country course with this new model. The new tail includes a full-fledged rudder trim tab instead of the spring bungee on the 1947 model. The same overhead knob now operates that tab; the elevator trim also is in the same place, overhead between the two front seats.

Once you get the rudder and elevator tabs set for cruising horsepower, you can tuck your feet under you and fly the airplane's full range with only one hand resting lightly on the wheel.

There are several other new features on the 1948 *Voyager*, most of them small, but nevertheless welcome. For instance, the rear seat has been lowered somewhat and the backs of the front seats now are hinged so that they can fold forward (a safety feature which minimizes injury to back-seat passengers in case of an accident).

And there are two new ventilators in the rear seat, several improvements in the radio installation, new flush door handles with locks, a new rear window, built-in tie-down rings, oil filters, a mooring kit, and so on. The battery has been moved ahead of the firewall for easier servicing, a feature that would be welcome on some other planes.

There is nothing radically new about the 1948 *Voyager*, in other words, and Stinson's razor-sharp sales organization makes capital of that fact. They know they have an old basic design, but they will tell you that the same is true of the average automobile. Stinson's whole sales policy is geared along automobile-selling lines. They want no part of flashy radicalism. They are selling a tried and true, simple, easy-to-fly, safe conventional airplane, and you only need look at the figures to see how thoroughly they have topped their segment of the market. Stinson is determined to sell its customers the greatest dollar value possible, plus the maximum in utility and low-cost operation.

The operator of one large midwest airport unsuspectingly paid Stinson a great tribute recently: "If I had to live on the maintenance of *Voyagers* I'd have closed up shop long ago."

—MAX KARANT

AIRCRAFT BEAM WATCHER

THIS interesting instrument, developed by the Miller Electro Research Laboratories of Milwaukee, Wis., might be called a pilot's nerve-saver. Any pilot who has listened to a squalling aircraft radio hour after hour, while flying the beams cross-country, will know what we mean by "nerve-saver."

The Visual Range Indicator, as it's officially known, is primarily a galvanometer redesigned so that the pilot can fly an airway beam by watching the dial, rather than have to wear headphones. The needle moves from left to right in a sweeping motion. When flying in the "A" quadrant of a beam the needle-sweep consists of a short movement to the right, followed by a long one—the Morse code dot-dash. It's the reverse for "N"; a long sweep, followed by a short. When directly on course—and assuming there is no static—the pilot can hold the needle directly in the center by adjusting the volume.

But this instrument is not able to discriminate between radio signals and static. In heavy static conditions the needle jumps all over the dial; it's next to impossible to pick out the beam signals from the static, so you have to go back to the headphones. Otherwise, the V.R.I. should prove a boon to the nervous pilot. M.K.

Mississippi Gulf Coast

(*Continued from page 47*)

included Mississippi, in 1781, there ensued a controversy between that country and the United States over the rights to the area, with the result that Spain reliquished her claims and withdrew in 1798. Mississippi became a state in 1817. During the Civil War the state was the scene of many battles and the years following were ones of severe economic depression. The beginnings of industrial development in the late 19th century brought comparative prosperity. The state is today primarily an agricultural region.

While all these events were taking place, the Gulf Coast area went more or less in its own direction. The warm, irregular, sheltered waters were ideal for commercial fisheries. Today, in Hancock, Harrison, and Jackson counties (which lie on the coast) over 16,000 persons are engaged in the fishing industry. Biloxi is one of the outstanding fishing centers, being one of the largest canners of shrimp and oysters. Located near natural harbors and the vast, easily accessible oyster reefs of the coastline, it cans 50 per cent of the nation's oyster pack. The annual shrimp pack exceeds 8,000,000 cans and the oyster pack 11,000,000. Picturesque and quaint, the Biloxi fisheries are fascinating to visitors.

As might be expected, an area so favorable to commercial fishing also attracts sport fishing. And with that go boating, resort homes, golfing. Principal resort cities are Pascagoula, Ocean Springs, Biloxi, Gulfport, Pass Christian and Bay St. Louis. These places are visited by northerners in winter, by southerners in summer. A multi-million dollar scenic sea wall has been built along a large part of the coast, and is paralleled by a parkway. There are fine golf courses, large yacht basins, beaches, theatres, night clubs, tennis courts, and dance halls. This may give the impression that it is an expensive area but any apprehension about costs disappears as soon as it is pointed out that there are many motels, tourist courts, and fishing camps, which charge from a dollar or two up.

The creeks, rivers, and lakes which lie inland a short distance are fine places to go for bass with plugs, flies, and natural bait. Flat-bottomed boats are available, as are native guides and outboard motors if one wishes to travel far from base. Speckled sea trout—nice big ones of several pounds—come up the rivers in winter and can be taken by trolling and from wharfs with shrimp, spoons and standard bass tackle. Trolling for them is the Coast's favorite winter sport. There are also bream, crappie, and others. Nonresidents and all persons using artificial bait must have a fishing license, costing $3.25.

The various islands off the coast form the Mississippi Sound, which contains many small salt-water fish. The islands, once a rendezvous for pirates, were named by the French colonists immediately upon their arrival. Ship Island was so named because its shape offered safe anchorage for small craft. Horn Island got its name supposedly because one of the party lost a powder-horn there; Cat Island was infested with raccoons, which appeared to be a kind of cat to early explorers. The sands of the islands can be used by small planes whose pilots wish to explore, picnic or fish.

Deep-sea fishing boats can be chartered at some of the bigger ports like Biloxi. The best fishing is in the warmer months, but information on what fish might be biting in the winter can be had at local docks. The majority of these boats rent for $50 per day and can take several persons out. If the deep sea fish are not around there is still sport aplenty in the rivers and lakes.

For the hunter there are quail, deer, geese, turkeys and foxes in season. There is a great deal of interest in fox hunting with dogs and a number of important field trials are held during winter months. The non-resident small-game license costs $5.25, and the license for all game costs $15.25. Quail are in season from December 10 to February 10; rabbit and fox can be hunted all year, and deer are in season from November 26 to January 1.

Additional details on hunting seasons and laws can be obtained from the State Agricultural and Trade Board, State House, Jackson, the state publicity organization. The Board can also provide information on practically any subject regarding Mississippi. Chambers of Commerce in Gulfport, Biloxi and other coastal cities can furnish local information about accommodations, sports and places to go.

Points of historical, industrial and recreational interest can be found through-

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Airport	Telephone	Nearest town and distance	Length of longest runway	Service Facilities	Gas Grades
Bay Aero Seaplane Base 30°25′—88°53′		Seymour (.6 mile)		Minor repairs	80 Oct.
Flying Clipper Service Base 30°20′—88°53′	467	Biloxi (½ mile)		Charter	80 Oct.
Gulfport Municipal (Army) 30°24′—89°03′	1529 2409 2414 2158	Gulfport (3 miles)	7,000′	Charter, restaurant on field, hangar storage	80, 91 Oct.
Jackson County 30°22′—88°29′	Moss Point 5081	Moss Point (3 miles)	4,500′	Major, minor repairs, charter	80, 91 Oct.
Keesler Field (Army, for emergency use only) 30°24′—85°55′	1440 Ext. 8181	Biloxi (2 miles)	6,600′		100 Oct.

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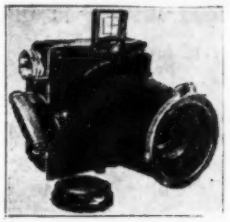

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out the Gulf Coast. Pascagoula is an industrial city on the Singing River, a river from which a humming sound seems to come. No satisfactory explanation has been offered for the phenomenon. During the war there was much shipbuilding here. A few miles northwest of Pascagoula is Magnolia State Park, a recreational area which has attractive and inexpensive cabin accommodations. Ocean Springs, previously mentioned as the site of the first settlement, has mineral springs, beaches and sea drives. The Gulf Hills Golf Course is immediately north of the town.

Besides its fishing wharves and canneries, Biloxi has several historical points of interest such as old houses dating from the times of the French, stately old trees, a legend-surrounded lighthouse built in 1848, and more modern things such as Keesler Field, AAF training base during the war, yacht clubs, a Coast Guard air station and the U. S. Veterans Administration National Soldiers Home. A few miles east is Beauvoir, home of Jefferson Davis, president of the Confederacy.

Gulfport, newest of the coast cities, is headquarters for yachting activities. The Municipal Yacht Club is its distinguishing feature from the air and is a huge development reaching half a mile offshore and connected to the mainland by a wide driveway. There are docks for ocean steamers here too, and the city is the state's only deep sea port. Naturally a large volume of traffic flows in and out and there are several factories nearby producing fabrics, naval stores, fertilizer and creosote.

Pass Christian is a quiet, aristocratic resort town with a fine beach, harbor for small craft and stately homes. It is the home of the columnist, Dorothy Dix. Bay St. Louis is much the same sort of place, and, being very old, has many historic points of interest.

There are a number of airports along the coast, and the whole area is shown on the Mobile (P-7) Sectional. Flying weather is good the year round with few extremes in temperatures. During the winter months the climate is mild, ranging from about 45° to 65°, and averaging 50° to 55°. Facilities for both land and seaplanes are provided. Larger fields such as Gulfport Municipal and Jackson County Airport have complete facilities.

Situated between Mobile, Ala., and New Orleans, and accessible from the north and east by easily-flown routes, the Gulf Coast area is an attractive winter playground for flyers who may not wish to go as far south as Florida.—ROBERT J. WHITTIER.

Letters

(*Continued from page 6*)

we were omitted from the tabulation perhaps you would publish that Spartan School of Aeronautics holds CAA Approval No. 4 as an advanced flying school, and that the following courses are offered: Private pilot, commercial pilot, instructor rating, instrument rating, multi-engine rating, airline transport pilot rating.

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MAXWELL W. BALFOUR
Vice President and Director
Spartan School of Aeronautics
Tulsa, Okla.

COMMENTS ON NOVEMBER EDITORIAL

In his editorial "Mr. Marshall Suffers a Lapse of Memory" (November issue), Mr. Ziff expresses my ideas much better than I could. I agree with him in every particular. I wish every intelligent American citizen could have the privilege of knowing his views on this important question.

ROY O. WOODRUFF
Congressman, 10th District Michigan
Washington, D. C.

Copies of the editorial should be sent to every Congressman and dropped on all the cities of Europe (wrapped around an anvil).

We have an example right here in Lane County. There is a big plant which was built to make alcohol from wood waste. Completion was held up for lack of some items of equipment that were being exported in huge quantities. The delay was so great that the plant is still not out of the experimental stage, although intended as a war project. Thus the shipping of our equipment abroad creates more shortages and more crises for the leaders of the new international WPA to cry about.

WILFRID R. FRANSON
Eugene, Ore.

The editorial was appalling because Mr. Ziff's accurate observations of the scene about him are coupled with such irrational conclusions. It is distressing that anyone connected with aviation should fail to recognize the implications of the "one world" which advancing aviation technology has presented to this post-World War II generation.

Mr. Ziff's thesis boils down to this: (1) There are two powers in the world, the USA and the USSR; (2) America's security rests ultimately upon its military strength, specifically, on an overwhelming air force; (3) America is not now strong; (4) European aid programs under the Marshall plan and Truman Doctrine will not make America militarily strong;

therefore, (5) the money and effort going into bailing Europe out should be spent instead to build the biggest air establishment we can and let Europe take care of itself. Only then can America be secure.

In saying that our nation can be secure if it has a big air force, Mr. Ziff has apparently forgotten something which has become horribly trite: This is the atomic age. War is now a luxury we can no longer afford, nor does security rest in military might.

Security to America means an adequate defense. But today, in the atomic age, there is no military defense. Who says so? First, the scientists. To a man, they plead for a political solution to problems of atomic control. Second, Air Forces' General of the Army H. H. Arnold, in his book "One World or None," says that the most the air forces can do to keep our country safe is a very poor second best. The first defense is political through the abolition of war. Third, the Army, through a special research committee of the general staff to study atomic defense, reached the conclusion that atomic defense is not military, it is political.

No, Mr. Ziff, the answer does not lie in more and more armed forces. Peace is possible only when there is law and order. Law is possible only under Government. Government is effective only when the individual is responsible before the law. The price of peace is not arbitrary force. The price of peace is justice.

LAWRENCE DAWSON
Executive Director
The Illinois State Branch of United World Federalists, Inc.
Chicago, Ill.

ADVICE TO JUNIOR

I got quite a bang out of the letter by Herb Raynor, Jr. ("The Mail Box," November) who seems to have "busted his gadget" more than once. I haven't figured out whether he wants a great big colonel's eagle pinned on his shoulder for all his so-called bravery in showing us that he can fly a pile of broken spars, ribs and fabric held together with bailing wire and glue, or whether he makes a habit of busting his gadget to have some shapely blonde come to the hospital and hold his throttle arm.

If he will be so kind as to get a copy of Part 60 of Civil Air Regulations, he will notice that a few changes have been made as of October 8, 1947. These changes, along with other numerous revisions in the past, have been caused mainly by the dud who wants to really "pour the coal to the maximum goose" and of course, as the saying goes, "they never found out what first busted loose." It's wonderful to make an impression on the girl friend but it's kinda sad when the impression ends up in her living room floor.

As far as I'm concerned Junior can play with his bailing wire and glue elsewhere. I don't want him on the same airport with me, and I think it would do him good to start putting a little more thought to your "I Learned About . . ." series.

PAUL D. SAYERS
Washington, D. C.

END

I Learned About . . .

(*Continued from page 56*)

Las Vegas it had to be. There was no field closer; nothing but wild, snow-capped peaks.

I throttled back, cursing myself for accepting the plane. The black muck spread from the windshield over the entire canopy, and the ground became a vague blur. I flew instruments. There was no way of telling how much oil I was losing; and even if the oil held out, the thought of bringing that plane over the fence at 130 m.p.h. with the windshield blacked out left me cold. I cursed further when I remembered I was breaking a rule by wearing no goggles. Opening the canopy and exposing my eyes to that stream of hot, driving oil would be worse yet.

It was a tense half hour before I caught a glimpse of the field. Hazy. Distorted through the oil. I radioed the tower of my predicament, slammed down gear and flaps. I fished for a handkerchief and, with the plane slowed down to bare flying speed, managed to reach out and clear a small patch of windshield in time to line up for the final approach. The plane dropped and rocketed onto the runway, but the cleared patch smeared over fast. I struck the concrete at an angle, saw a runway light flash by a wingtip, then I was rolling hard onto the sand. The *Thunderbolt* slewed wildly, struck a soft spot; the tail snapped up. I waited for the plane to flip onto its back then, miraculously, the tail came down. I climbed out, weak and sweating.

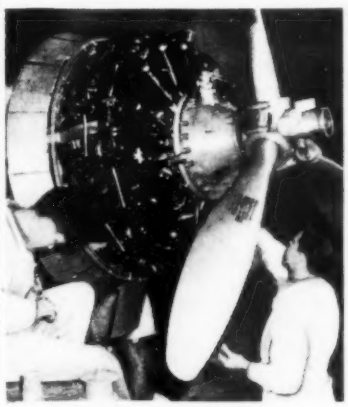
"Top rocker boxes loose," the crew chief said. He eyed my relic dubiously. "Close. You're going to leave her and cancel out?"

The second big mistake came right there. I found myself looking at that plane as if it had become a personal enemy; a streak of stubbornness that, believe me, should be overcome by any pilot, came to the fore. "Fix the rocker boxes!" I ordered. "My orders say Salt Lake."

I waited several hours, edgy and restless, then climbed high and hard out of the field. There was no relaxing this time; rocky, jagged peaks and ravines angled off below. I listened to every beat of that pounding old engine. I remember thinking, "Am I flying it, or is it flying me?"

Half an hour. An hour, and no trouble. I checked the tanks and thought idly: This heap is burning half again more fuel than is normal. Plenty to get there, but is there a leak? Or is it just old age? I shrugged; too late to do anything about it.

I sat, fidgety, until the rim of mountains surrounding Salt Lake became distinct. Then, breathing a long sigh of relief, I started a shallow dive down into the sandy bowl of the city. I remember



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thinking: Well, I flew it. Done. Finished. I even took Form One from the map compartment and wrote, "Gas consumption abnormal; ship otherwise okay." Then, with the crisscross of runways underneath, I wrote with a flourish, "Ship Delivered."

That last was prophetic to say the least. I called the tower, made a wide pattern, and trimmed the *Thunderbolt* into its usual glide. I straightened out into the final approach, flared off as the ribbon of concrete slid below. The wheels touched with scarcely a jar. I sat back, smug, automatically holding the nose straight.

The sitting back lasted but a split second: a split second of false security. The tower operator's voice crackled in my ears, harsh, urgent. "P-47 pilot, leave that ship immediately! Fire!"

I froze. Me? The ship was still rolling fast, apparently normally. Then I heard the big engine idling, sputter and die. And one thought I remember clearly. Hundred octane. Hundred octane and fire and chum, you're sitting on it!

Instinct took over. I slammed back the canopy, yanked off my earphones and unstrapped my shoulder harness, seemingly all at once. I remember hitting the brakes, feeling the tail of the ship come up. Then I dove. How I ever did it from a sitting position I will never know. I hit the wing, face down, then the runway, and I rolled. The impact squeezed the last breath from me; it seemed as if I rolled forever.

Seconds . . . it seemed like hours . . . later, I managed to sit up. I saw, groggy, that the luck of the foolish had held good; my parachute, broken open and torn to shreds, had taken the brunt of my fall. I started to examine myself, gingerly. Then I saw the ship.

It was still rolling as I looked, but behind it the runway was a sea of fire. Burning gasoline streamed in the *Thunderbolt's* wake, flaming up into oily black smoke. The ship slowed, perhaps 100 yards from me. Then, as if someone had dropped a bomb squarely into the cockpit, there was a muffled roar and pieces of airplane flew everywhere.

I thought dazedly: "Mechanical condition . . . abnormal gas consumption . . . leak, and the line finally parted . . . and it could have happened in the air. . . ."

I was unhurt, but riding in to operations I wasn't listening to the chatter of the men in the jeep. I was thinking—brother, you learned something about flying from that. *Be sure of the mechanical condition of your airplane. You aren't flying a ship you don't trust; it's flying you. And if you've got to get stubborn, do it on the ground.*

It will be a cold, cold day before I forget that. END

Sky Wardens

(*Continued from page* 43)

unmarked traps. Just before dark, beside a small stream running out of Ross Lake, they discovered a canoe. Cooper remained near it. Austin moved cautiously down a trail which showed fresh cuttings. Soon he came to a camp, stepped into a thicket and waited.

An hour passed. A limb cracked in the hastening dusk, and Austin stepped out of hiding. He had his man dead to rights, for fresh beaver pelts were slung over the trapper's shoulder.

Cooper came in shortly. He made his arrest when the second trapper had gone to the canoe.

Austin and Cooper stood alternate watches throughout the night. It was cold. Shell ice was forming on the lake. When Turgeon flew in next day his pontoons cracked through and he had to taxi up and down the lake for two miles keeping his take-off open. By this time his fellow wardens had collected the skins and were ready to leave.

Turgeon was impatient, fearful he would be frozen in. "Let's get out of here," he urged.

He flew the four to Fort Kent. Next morning the trappers were convicted and sentenced to two months in jail.

This is a typical incident in the life of Maine's flying game wardens. In Northern Maine is an area at least 100x80 miles where the wilderness is unbroken by roads and uninhabited save by a few trappers. The only way the wardens can possibly cover it is by plane.

Maine wardens have been flying patrol for eight years. The state has three qualified pilot-wardens at present and two more are being trained. They fly three Piper *Super Cruisers*, a *Cub*, and the custom-built Stinson in which Turgeon ferried Cash Austin and Curt Cooper. These planes account for about 2,700 hours of flying each year in patrolling the 8,000-mile Maine wilderness.

Maine has found it best to take trained woodsmen and teach them to fly rather than teach trained pilots to become woodsmen. The practical level-headed woodsman makes an excellent pilot. The Game Patrol's planes are checked daily by their pilot-wardens and get 100-hour checks in a commercial hangar.

Arrests are not the main duty of the pilot-wardens. They fly ground wardens over their districts at regular intervals. If they see anything suspicious they land, leave the ground wardens to ferret out the case, and then keep in touch with them, supplying food, and hauling them and prisoners, if any, out of the woods.

Another big job is stocking fish. Their planes carry fish fry into hundreds of otherwise inaccessible ponds and lakes.

Warden supervisors in the 13 districts throughout the state contact the pilots if they find anything suspicious. There are an average of 10 wardens in each of the 13 districts, and they are flown over the country for surveillance. They have established such an excellent reputation that they are fast becoming crime preventors and it is not necessary to make so many arrests. Illegal beaver trapping is the chief offense in Northern Maine, with jack-lighting deer at night the major offense elsewhere in the state.

The flying wardens are slowly choking off the first, and are making some progress in the second, despite the hazards of night flying. END

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TRADE Swift with 63 hours total time for new 1947 Automobile. Lewis Crawford, Goldville, S. C.

SWIFT. 85 H.P. Aeromatic Prop., Radio, T & B, R of C. 235 hours. Excellent shape. Best offer over $2,000. A. D. Lucas, 3824 Englewood Lane, Fort Worth, Texas. Ph. 6-2115.

SWIFT, 125 h.p. Trade for Cub Cruiser, Luscombe 8E or car. Ray Williams, Box 271, Freewater, Oregon.

85 h.p. 120 HOURS, perfect condition, GE 2-way, nav. lights, leather seat, Beech prop, prop cover, terrific for XC, licensed to May. Cost $4400, will sell for ?. Box 560, % Flying.

GRUMMAN

GRUMMAN Widgeon, amphibian, full instruments and equipment, perfect condition. Less than 100 hours total time. Best offer around $15,000. May consider smaller plane in trade. M. O. May, 148-2-B, NAS, Alameda, Calif.

HOWARD

HOWARD 5 place night and instrument. 151 gas, hand-rubbed, 626 total 15 since major. See this before you buy. $3750.00. Will take Super Cruiser in trade. Hoffer Flying Service, Camden, South Carolina.

HOWARD DGA-15-P. Licensed until January, 1948. 450 hours since new, night, instrument, 24 volt, pants, spinner, constant speed, two transmitters, three receivers, four chutes, flares, excellent fabric and maroon paint. $3,995, will add cash and trade for licensed Beechcraft D-17S. Ray Shannon, 50 Hawthorne Street, San Francisco, Calif.

JOHNSON

JOHNSON Rocket: 70 hours total, new condition, 2 band Bendix radio, VHF transmitter, blind flight instruments. Hand rubbed yellow finish. A fast sportsman's airplane, with low operational cost. Cruises at 165 MPH. Will demonstrate. $5,000. Edward J. Cromer, 142-34 60th Ave., Flushing, N. Y., Flushing 3-2625 or Hollis 4-3121.

JOHNSON Rocket 185. Exceptionally clean. Two-way radio, homing loop. Only 50 hrs. total. $5,300. John Cheek, Jr., Franklin Rd., Nashville 4, Tennessee.

LUSCOMBE

1941 LUSCOMBE 8A, 65 Continental, just completed 100 hour relicensing inspection. 160 hours since major overhaul. Total time 600 hours. Two-way radio, generator, all instruments, perfect shape. $1400, no trades. Isabel Anderson, 250 South 17 St., Philadelphia, Pa. PE-5-5245.

LUSCOMBE: Purchased new September, 1946. Less than 100 hours total time. Re-licensed Motorola Receiver, Standard Instruments. C. W. Custer, 16305 Glynn Rd., Cleveland Heights, Ohio.

LUSCOMBE 8A 1946. Only 200 hours total time. Privately owned. Always hangared. Has sensitive altimeter, rate of climb and turn and bank instruments. Price, $1400. Write Dave Florin, 4618 North Adams, Spokane, Wash.

1947 LUSCOMBE 8A. Hundred hour check June, 26. 25 hour check Sept. 9. Extra equipment with radio. Insurance included. $2,095. Wesley Trollope, Waco, Nebraska.

LUSCOMBE 8A. Mfd. May, 1946. $1650. Write Monroe Arne, Carpenter, S. D.

NAVY

NAVAL Aircraft Factory N3N-3. Recovered, relicensed, 100 hr. check. Excellent condition. Red and silver. 235 H.P. Wright. 380 hrs. since new. Will sell for best offer. John McIver, 45 South Third St., Oxford, Pa.

NOORDUYN

NOORDUYN Norseman. First offer over $2000.00. Can be put in A-1 condition for $1600.00. Box 554 % Flying.

PIPER

SEAPLANE Super Cruiser. Late '46. Total time 180 hours. 100 H.P. Lycoming, aeromatic prop. Hallicrafters transceiver, sensitive altimeter. Corrosion proofed, fuselage recovered and relicensed Oct. 1947. Never cracked. Floats new June 1947. Beautiful clean job. Location Maine. Price $4250. Box 561, % Flying.

PIPER Cub, 65 h.p. '47 model. Excellent condition. Mrs. C. Neal, Oklahoma City, Okla. Phone 53663.

1947 CRUISER, two-way radio, perfect condition. 90 hours. $2,675. P. O. Box 1886, Atlanta, Georgia, or call Main 0684.

1946-J3. LESS than 250 hours, privately owned. $1495. Thomas P. Scherrer, Shawneetown, Ill.

FOR Sale: 1 1941 J-3 Cub. Low time since engine major. Ship in good condition. Priced for quick sale due to shortage of hangar space. $695. Box 565, % Flying.

CUB-40-Coupe C-65. A-1 condition. Just majored. Licensed. $995.00. A. Bailey, Urschel Field, Valparaiso, Ind.

NORTH AMERICAN

NORTH American Navion. 110 hours total time. Perfect condition. All modifications completed 100 hours. Complete gyro blind-flying kit, South-wind heater, defrosters, navigation and landing lights, two-way radio. Always hangared. Never scratched. Must sell, first offer over $6,-500. Harold J. Shelden, Jr., Alzada, Mont.

SNJ-3 168 HOURS on new engine. Air Frame 857 hours total time. Licensed Night & Day. Deluxe in every detail. John Bonifer, 28 Magnolia Place, New York 61, N. Y.

NORTH American SNJ-4. 400 hrs. total time. Just relicensed day and night. Clean. Converted Navy command radio to 3105. Complete instruments and new tires. Bargain at $3000.00 for this ship. Write or contact 1st Lt. John L. Crone Sqdn. TS-1, 3704 AAFBU, Keesler Field, Miss.

PORTERFIELD

SACRIFICE. (No hangar.) 1941 Porterfield LP65, low time since major and refinish. Licensed, 995. P. O. Box 505, Gloversville, N. Y.

REPUBLIC

SEABEE, 1947, private, steerable tail wheel, 25 hours, never damaged. Privately owned. Correspond. Department C. P. O. Box 94. Wall Street Station, New York 5, New York.

SEABEE. New March 1947. Less than 100 hrs. Extras include Kollsman directional compass, three band Hallicrafter radio and Kollsman rate of climb. Private owner, always hangared. $5,000. C. T. De Puy, 634 Lexington Ave., Rochester, N. Y.

SEABEE NO. 1000. Steerable tail wheel plus all late improvements, 64 hours total. Price, $5,000. Stuart Kilgour, 1427 W. Chase Ave., Chicago 26, Ill.

SEABEE, very responsive, 40 hours total. Sensitive instruments with extra vertical speed, directional gyro, reversible propeller. $5,600. Norman Parker, Winchendon, Mass.

FOR sale 1947 deluxe Seabee. Only 20 actual hours including ferry time. Perfect condition. Two-way radio. Bargain. South Bend Screw Products, Inc., South Bend, Indiana. Telephone 3-1143.

WRECKED Seabee, for salvage. As is only, $1000.00. Dr. Hoard, 311 W. Gandy, Denison, Texas.

RYAN

RYAN PT-22. Top-oiled Kinner 165 H.P. 1941 model, 400 hours. Licensed in May. Refinished in red and blue. Cleanest in country. $950. Roger Falde, Hawarden, Iowa. Phone 242-J.

STEARMAN

STEARMAN PT-17. Excellent condition. 125 hours since overhaul. Blind flying instruments both cockpits. Licensed June. $1,200. Deliver free 800 miles. Correll. 112 Edgehill Road, Fairfield, Conn.

STEARMAN, Licensed March, 1947. 300 hours since overhaul, steerable tail wheel, McCauley prop. $900.00. Walter Kieckhefer, Jr., 2819 E. Bradford Ave., Milwaukee, Wisc.

STINSON

1947 STINSON Voyager 150. Perfect condition. 150 hours total ship and engine. All standard equipment including 2 way radio. Priced at $4250 for quick sale. Will deliver for expenses. Harold Rea, Asheville, North Carolina.

$3500 WILL buy new Stinson V-77. Licensed 5 place, instrument, night flying, 45 hours on engine, airframe since new. Extra constant speed propeller. Bob Brewer, 3541 Hyland Drive, Salt Lake, Utah.

BEST offer. Stinson 10A, primary Group, new prop., two-way radio. Fred Hoffman, Trenton, Nebraska. Phone 2178.

1947 STINSON Voyager, red, new condition, privately owned, never damaged, priced right. Ken C. Thomas, % Armco, 3202 W. Sample St., South Bend, Indiana.

STINSON Voyager 165. Manufactured June, 1947. 71 hours time. Never cracked, always hangared. 2-way radio. Heater. Full set instruments for instrument flight. Landing lights. Airplane and engine in perfect condition. Cost new $6,-149.00. Price $4,750.00. J. A. Longnecker, Kendallville, Indiana.

VOYAGER 150. 1946, perfect condition, always hangared, 260 hours total time, aircraft and engine, two-way radio, landing light, etc. Sacrificing at $3,250.00. Tony Locatis, Fort Dodge, Iowa. R.F.D. 4.

STINSON Voyager 1947—yellow. Aeromatic Prop. and complete instruments. Immaculate. $4500. Dr. Paul Blaisdell, 102 N. Madison, Pasadena 4, Calif.

1947, 150 STINSON Voyager. Complete set instruments. 65 hours time. Like new. $4000.00. Carl A. Schacht, Lawrenceville, Illinois. Phone 644-J.

STINSON 150, 1947 Model. $4,250.00. Total time since new, 200 hours. This ship is good as new. Sky Harbor Air Service, Inc., Phoenix, Arizona.

STINSON 10A. Brand new engine, blind flight group. $1650. Herb VanWyk, 1120 College, Davenport, Iowa.

STINSON Station Wagon 165, blue, standard group, 135 hrs., excellent shape, $4680.00. H. E. Ferris, 2 Lackey Drive, Williams Bay, Wisconsin.

STINSON 105. 3 place; Continental 75, 150 hours since new; starter, new prop, Blind flight group, 2-way radio, 7 hours gas supply, cabin heater, $2,200. Tel. East Hampton Long Island 475. Arnold Bayley, Sea Spray Inn, East Hampton, N. Y.

TAYLORCRAFT

TAYLORCRAFT L2-B, 1942. Airframe and engine 1400 hours. $800.00. W. Deane, 1340-D Tenth, Oxnard, Calif.

1946 TAYLORCRAFT BC-12D Standard. 150 total hours. Sacrifice $1,500. Ogden Kiesel, P.O. Box 198, LaFayette, Calif.

1942 TAYLORCRAFT (65 H.P., BC12-D) maroon and cream finish; two-way radio, wheel pants, just relicensed. Sell or trade for car. Charles Bowman, La Fontaine R. R. 1, Indiana.

TAYLORCRAFT tandem, just overhauled, re-licensed, refinished cream and vermilion. Bargain $850.00. M. R. Walker, Hotel Whitehouse, Pine Bluff, Arkansas. Telephone 4695.

VULTEE

BT13A ALL metal, insured, licensed for instrument, new tires, radio, 230 hours since new. $1500. Will deliver for expenses. Miss Teddy Zeedyk, 148 West Van Buren, Battle Creek, Michigan.

BT-13 RECENTLY licensed, less than 150 hrs. since major. Complete dual instruments including hood, everything in perfect working condition. Airplane clean and in excellent shape. A bargain. Harold Yanklowitz, 223-227 Warren St., Glen Falls, N. Y.

HAVE 2 BT-13's licensed. Will sell one with wood mono for $695 and one all metal for $795. Both are in excellent condition. Lawrence Taylor, Winner, S. Dakota. Phone 18F11.

VULTEE BT-13A, all metal, 95 hours since major overhaul on aircraft and engine, five hours since 100 hour inspection. Price $895.00. All inquiries answered. Write: F. Wuliger, Jr., 2841 East 37th St., Cleveland 15, Ohio, or call MIchigan 0444, Cleveland, Ohio.

MISCELLANEOUS

SAILPLANE, Laister-Kauffman LK-10A, Serial 93, two sets instruments and trailer. Licensed to September, 1948, total time 82 hours. $880. Fort Payne Flying Service, Ft. Payne, Alabama.

WE'D rather make $50.00 on ten planes than $400.00 on one. '43 Howard, 450 HP Pratt & Whitney, only 14 hours, licensed, like new, $3694.00. Aeronca, NC-23949, 65 Hp, just majored and licensed, $695.00. '46 Ercoupe, NC-93866, 110 hours since new, $1998. Twin Cessnas priced from $595.00 up. BT-13's $395.00 up. Licensed AT-6's, $1150. 75 others to choose from. Written guarantees. Like new AN type back, seat or chest chutes, $49.50, packed, money back guarantee. Write for our list. The largest aircraft dealers west of the Mississippi. Vest Aircraft Co., 4600 Dahlia, Denver, Colo.

USED Airplanes. Selling-out bargains. Extraordinary buys! Licensed. Privately owned. National Directory, 25c. Aero-Traders, FM, Adams, Mass.

AIRPLANES WANTED

CUB J3. Gas tank good condition. Price right. Rich, P. O. Box 153, Lomita, Calif.

FOUR place plane for private use. Must be good. Cash for quick deal. Write P. O. Box 5871, Westport Station, Kansas City, Missouri.

PARTS AND ACCESSORIES

INTERIOR Kit for Lodestar. Cost new at Lockheed factory $7500. Will take first $4000 offered. Henry Maddox, Jr., Bainbridge, Ga.

ARTIFICIAL horizons and Directional gyros, used in guaranteed workable condition, closing out at $12.50 each. Many other instruments, write for list. Hoffer Flying Service, Camden, South Carolina.

AIRCRAFT Phone Transmitter RCA Model AVT-112A. Frequency coverage 2500 to 6500 kc. Operates on 6 or 12 volts, easily converted to 24 volt operation. Brand new complete with tubes, less power supply and crystals. $12.95. RCA AVR-20A Companion Receiver to the AVT-112A Transmitter. Operates on 6, 12 or 24 volts. Brand new complete with tubes, less power supply. $12.95. Prices are F.O.B. Dayton. Srepco, 135 E. 2nd St., Dayton 2, Ohio.

FOR sale: McCauley Prop and Spinner for Model 415C Ercoupe, $95. F. O. B. Biddle Company, 832 Brunswick Avenue, Trenton, N. J.

FLOATS. Edo Model 2000 for Piper Super Cruiser. Like new. Complete with all fittings and fin area. List for $1,350. Will sell for $700 cash. Wolverine Air Service, Comstock Park, Michigan. Phone 72339.

FOR sale 220 Cont. complete with metal prop. $395.00. Also limited quantity large size 4" Venturis for gyros. and horizons, brand new $10.00 postpaid. Lee Savage, Chincoteague, Virginia.

MAGUIRE ART-1 aircraft radio transmitter, 12 volt, D.C. input, 8 watts, xtal control, $37.00 each C.O.D., F.O.B. See our ad page 74, October Flying. Globe Products Co., 870 Maplewood Ave., Bridgeport, Conn.

SEABEE Engine and parts for sale. Total time engine 3 hours. C. G. Welling, Edgewater, Md.

PIONEER Turn and banks. Good condition, $8.00. Trade some for sensitive altimeters. Steve Kecskes, 4427 33rd Pl., San Diego 4, Calif.

VHF ARC-3 EIGHT channel transmitters and receivers. Latest models frozen on surplus market. Our price $1,200 installed including 16 crystals, control, cables and antenna. The Sagert Radin Co., Chicago-Hammond Airport, Lansing, Illinois. Phone 886

AIRLITE Intercom. Self contained, sturdy, light, electronic intercom systems engineered for lightplanes. Complete with headset, microphone, volume control, batteries, and mounting bracket. Weight approximately 1½ pounds. Several models available. Write for illustrated information: Airlite Research Company, P. O. Box 712, Port Washington, N. Y.

TWO Stearman Dusters and one Sprayer (capacity 140 gals.). Good condition. Will sell separately. Price, $6500.00 complete. John L. Barden, Ithaca, Michigan.

PROPELLERS for ice-snow sleds, air boats. Catalog 10c. Banks-Maxwell, R. F. D. 12, Ft. Worth, Tex.

AVIATION EQUIPMENT

COMPUTERS, Dalton Model G, which straps to the leg, leaving one hand free, (formerly sold for $50.00) now only $7.50; Rolaire deluxe map cases for safe, easy pilotage, $14.95; Model G Rolaire, $9.95; AAF-type A-2 computer, $2.00; Weems plotter for measuring courses, speeds, distances, $2.00; new Model C American Airlines computer in leather case, with instructions, $5.00; E-6B Army computer, most widely-used computer in aviation, $10.00 (with leather case & instructions); and from our large war surplus stock: Army D-12 aperiodic compasses for aircraft, airports and marine vessels, $12.50; astro-compasses, with instructions, now only $8.75; Longines pocket compasses for sport or work, new, $1.20; Dietzgen 6-inch protractors, 20c; Elgin pocket stopwatches, like new, $12.75; Bausch & Lomb sextants, $37.50; like new F-8 aerial cameras, a "best buy of the month" at $175.00; pilots' briefcases, $6.50. Inquiries about new dealer agencies welcomed. Pan American Navigation Service, Dept. F-1, 120-21 Ventura Blvd., N. Hollywood, Calif.

PILOT'S license case, genuine leather hand tooled, $3.25. Deluxe sunglasses, gold plated rims and sweat bar. Imitation alligator skin case, reg. $12.50 value, $7.50. Wheel pants for all Luscombe Airplanes, Brackets included, $47.50. Decker steerable full-swivel tailwheel, $25.50. D-4 Computer, reg. $2.00 value—($9.00 per dozen), $1.00. New surplus sensitive altimeters, $15.00. New sensitive airspeed indicators F-1, $15.00. Rate of climb—new surplus, $15.00. Turn Bank—new surplus, $16.50. Air Corps Pioneer B-16 Compass—new surplus, $15.00. Directional Gyro A-5—new surplus, $17.50. Manifold Pressure Gauges, $12.50. Gyro Horizon C-7—new surplus, $17.50. Add 2½% tax to all prices. Check or P.M.O. No C.O.D. All prices include postage. Cliff Bantel, B&G Air Service, Inc., Torrance Field, P.O. Box 95, Torrance, Calif.

ALL wool gabardine L-1 flying suit, nine zippered pockets, in all sizes. While they last—$7.95. Your last chance to buy this garment at this low price. R.A.F. Manufacturing Company, 6 East Lake St., Chicago 1, Illinois. Buy direct and save.

BINOCULARS—New 7x50 Bausch & Lomb Binoculars with case, strap and filters $145.00. New 6x30 Navy Binoculars with case $65.00. Reconditioned Bausch & Lomb, Prism 6x30 complete with leather case and strap $33.50. Add 20% excise tax to above prices. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois, Dept. F.

AERIAL Photographic Equipment: We have largest stock in the world. Cameras include K3B's, K17's, K18's, K20's, D15's, K21's, K17B's, 35 mm. motion picture cameras. An excellent selection of vertical view finders, intravolometers, gun cameras, ringmounts, viewers, projectors, stereoscopes, portable dryers, all types of contact printers, at prices a fraction of wholesale. Let us know your requirements. The Coogan Co., 8440 Sunset, Hollywood 46, Calif.

WEATHER instruments for amateur and professional. Wind direction and speed. Barometers. Thermometers. Weather Associates, 401 N. Broad Street, Philadelphia 8, Pa.

A2 LEATHER Flight Jackets, Army type, dark brown genuine horsehide, cloth lined, windproof zipper, elastic knit waistband and cuffs. They look like new but are slightly used. Only $14.95 cash with order. Sizes 36, 38, 40, 42 and 44. Gold Crown Mills, Box 788, Enid, Okla.

A-2 TYPE flight jackets with genuine Mouton fur collar. Body make of the finest front quarter horsehide. All sizes. Priced at $19.75. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

NEW B-3 or ANJ-4 sheepskin lined fur jackets reinforced with horsehide. In all sizes $22.50 B-2 sheepskin cap in all sizes, $3.75. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

NEW A-2 type flight jackets in genuine goatskin. Knit cuffs and waistband, zippered front. Priced at $18.75. Names engraved in gold on leather strip with wings for only 75c. R.A.F. Manufacturing Company, 6 East Lake St., Chicago 1, Illinois. Buy direct and save.

NEW A-2 type flight jackets made of the finest horsehide or goatskin. Zippered front, knit cuffs and waistband with roomy snap pockets. Regular sizes priced at $18.75. For big men, sizes 48 and 50 priced at $19.75. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

NEW B-15 type jackets made of durable O.D. cloth. Alpaca lined, knit cuffs and waistband with genuine Mouton fur collar. All sizes. Now at only $11.95. R.A.F. Manufacturing Company, 6 E. Lake St., Chicago 1, Illinois. Buy direct and save.

B4 TRAVELING Bags—Army type, new O.D., large and roomy holds several suits without wrinkling plus many other items, $18.00 plus 20% tax. Wrist Watches—All new, A.A.F. Elgin wrist watches with large sweep-second hand, 15 jewel. Guaranteed against defective workmanship for one year. Price includes tax $31.75. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill., Dept. F.

NAVY Intermediate Flight Jackets—new, genuine dark brown goatskin leather, mouton fur collar, bi-swing back, zippered, celanese lined, elastic-knit waistband and cuffs $35.00. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois. Dept. F.

TIRES—Aircraft, new, 6.00x2 solid $1.00, 10:00 tail wheel $7.50, 6.50x10 $7.50, 8.90x12.50 $8.50, 5.00x4 $5.00, 6.00x6 $8.50, 7.50x10 $10.00, 8.50x10 $11.00, 12.50x4½ $5.00, 27" $10.00, 30" $20.00, 33" $22.00. Other sizes and tubes available. Complete new wheels, tires and tubes for AT6 or BT13 at $65.00 per set; subject to prior sale. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill., Dept. F.

GENUINE Navy Winter Flying Suits—new ANJ-Jacket, dark brown accrolite leather trimmed with goatskin, beige color shearling lined, large shearling collar, zippered, two large patch pockets. Sizes 34 to 48. $19.85 each. New ANJ Trousers to match—zippered down both legs, shearling lined. Same sizes $12.00 pr. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill. Dept. F.

PILOT Boots—New, shearling lined, dark brown leather, rubber bottoms. Army type has one zipper or Navy type, two zippers and partial rear lace. Small, medium, large and ex-large $16.95. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois. Dept. F.

HELMETS—AAF, new, A-11 kidskin leather, chamois lined with sponge rubber earcups $3.45 or ANH15 tan gabardine with sponge rubber earcups $1.00. Sun Dodger Flying Cap, long visor, khaki or olive drab twill $1.15. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill. Dept. F.

A2 FLIGHT Jackets—Army type, new, genuine horsehide leather, dark brown, zippered, cloth lined, elastic-knit waistband and cuffs $18.75 or same jacket with mouton fur collar $20.75. State size. Many other items. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois. Dept. F.

GLOVES—B3A AAF, new Flying Gloves, dark brown unlined kidskin leather $2.95 pr. Same glove in natural buckskin leather $3.95 pr. G.I. Gloves, khaki wool with leather palm, $1.95 pr. Dark brown leather gloves, lined, cotton wristlet $1.60. Regular wool knit glove, brown or maroon 95c pr. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois. Dept. F.

GAUNTLETS—Natural Deerhide leather, baby lamb shearling lined, one finger mitten type, medium, large and X-large $4.95 pr. Same gauntlet made of dark brown goatskin leather, small, medium & large, $6.95 pr. Brand new. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill. Dept. F.

B3 PILOT Jacket—Army type, sheepskin lined, dark brown accrolite leather, zippered $20.00. B2 Pilot Caps, sheepskin lined, long visor, ear laps $3.75. Pilot Vests, sheepskin lined $7.00. A11A Pilot Trousers—O.D. cotton twill, alpaca lined, zippered sizes 32 & 34 $18.00. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill. Dept. F.

BATTERIES—New AN3152, 12V, 34 Amp. 10" high, 9¾" long, 5¼" wide. Fits AT19, Stinson, PT23, etc., $19.75 dry or $21.75 fully charged, ready to go, guaranteed. Also, AN3151 24V. shielded, size 13 5/16" long, P39D&F 8¾" high, 9 13/16" wide, $24.75 dry or $26.75 fully charged. Fits UC78, T50 AT21AT7, AT11 and some Cessnas, etc. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill., Dept. F.

AIRCRAFT Radios: Motorola Air Boy Receiver: Receives Beacon, Weather & Tower. Complete weight with batteries 4#, shielded antenna housing. Designed for typical aircraft antenna range 100 miles. Super heterodyne circuit station log for beam, frequencies, call letters, $31.00 less batteries. Batteries $2.45 each, Headphones $6.50 extra. GE Transceiver, AS1B, brand new $165.00. ARC, Type 11 Communication System consisting of Remote controlled LF Range Receiver and VHF Transmitter. Supplied complete with microphone headset, antenna system and cobling, equal to airline installations. Price $427.00. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill., Dept. F.

GOLD Stamping—Names stamped 24K gold lettering on dark brown leather strip to sew on jackets, etc. One line 65c, two lines $1.00. No. C.O.D.'s on stamping orders. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois, Dept. F.

RAY Ban Sun Glasses, original ladies or gents $8.95, with sweat bar $10.95, Shooting glass with sweat bar $13.00 pr. Fisher Aviation Goggles, all types. Compass, Longines-Wittnauer pocket watch type compass $2.25. Mae West Life Jackets $4.00, CO2 Cartridges for same 25c each. Genuine brown calf wallet, the finest $4.50. Pilot License Case, P-1, genuine Morocco leather $2.50, P-2 sheepskin leather $1.25, plus 20% excise tax on wallet and license cases. Nylon Scarfs, white, 66"x18" $1.95 ea. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Ill., Dept. F.

TIE Down Kits—Complete kit in zippered case includes 3 ropes, 18 spear heads—a lifetime kit—$8.00. Heath tie down kit, for light aircraft $4.50. Aircraft Inspection Flashlight with long adjustable nozzle $1.75 ea. Aircraft License Holders—black artificial leather, celluloid window, size 7x4 ¾ 35c ea. Microphones, push button telephonic, T33C, $6.75 each. Low Impedance Head Set, large ear cups, $3.50 each. Head set extensions $1.00. Safety Belts, khaki, $1.50 each. Aircraft Clocks, Elgin, 8 day, four dials, elapsed time $65.00. All new items. Write us on instruments, props and engines, etc. Flying Equipment Co., 1641-5 W. Wolfram St., Chicago 13, Illinois, Dept. F.

BOOKS

COMMERCIAL and Private Pilot Ratings: Quiz system tests by Charles A. Zweng will help you win your flight ratings. For the private pilot, $1.00; for both commercial and private ratings, $3.00. Latest map-type examinations, with answers, are included. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., North Hollywood, Calif.

FLIGHT Instructor, by Charles A. Zweng, for C.A.A. examiners and applicants for flight instructor rating. Only book available which shows grading methods for flight maneuvers. Contains typical multiple-choice examination questions and answers. $3.00, postpaid or C.O.D. Pan American Navigation Service. Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

FLIGHT Engineers: Charles A. Zweng's new "Flight Engineers Manual" contains typical examination questions and answers for flight engineer rating. $4.00, postpaid or C.O.D. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

MECHANICS' Examinations for 1948 can be found in "A. & E. Mechanics' Manual" (Zweng). New revised edition contains questions & answers not available elsewhere. 254 pages, $3.00, postpaid or C.O.D. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

CAR for Pilots, a new book of Civil Air Regulations which apply to airmen of all ratings. Arranged & Indexed for fast, simple reference to any desired regulation. Includes latest revisions (to November 1947). Postpaid or C.O.D., $1.00. Pan American Navigation Service, Dept. F-1, 12021 Ventura Blvd., N. Hollywood, Calif.

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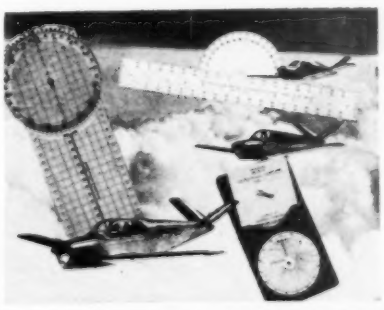

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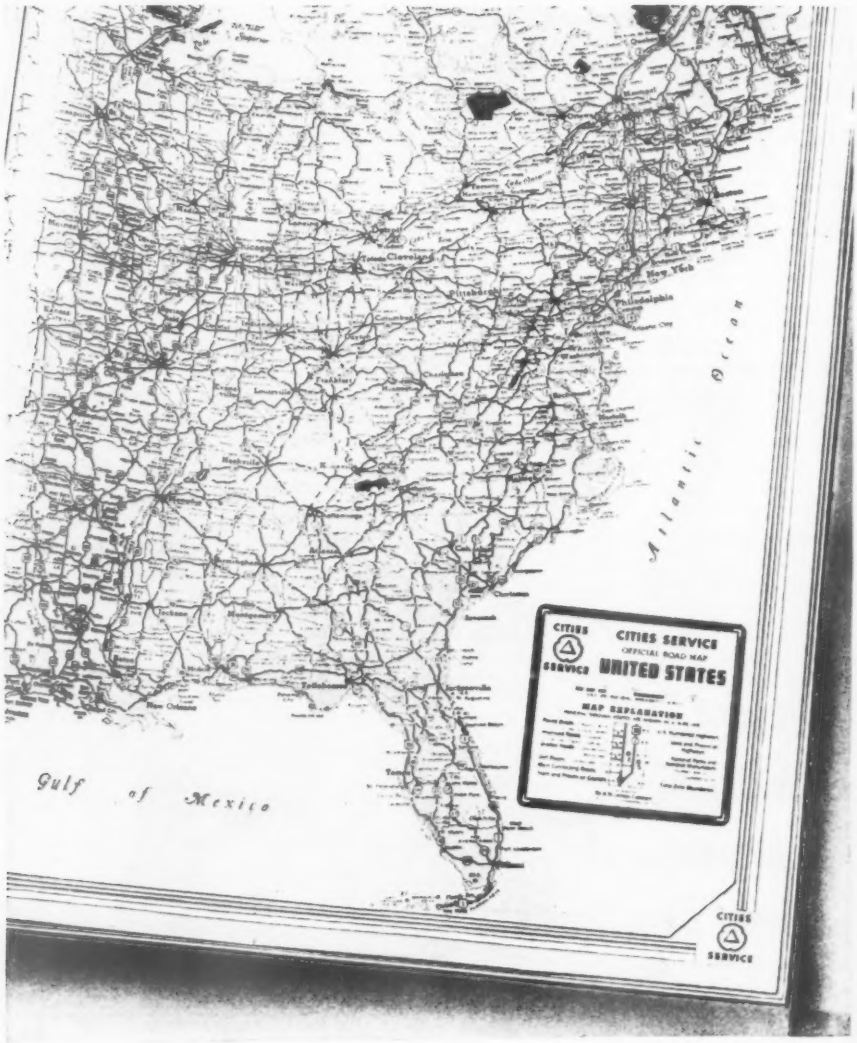

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